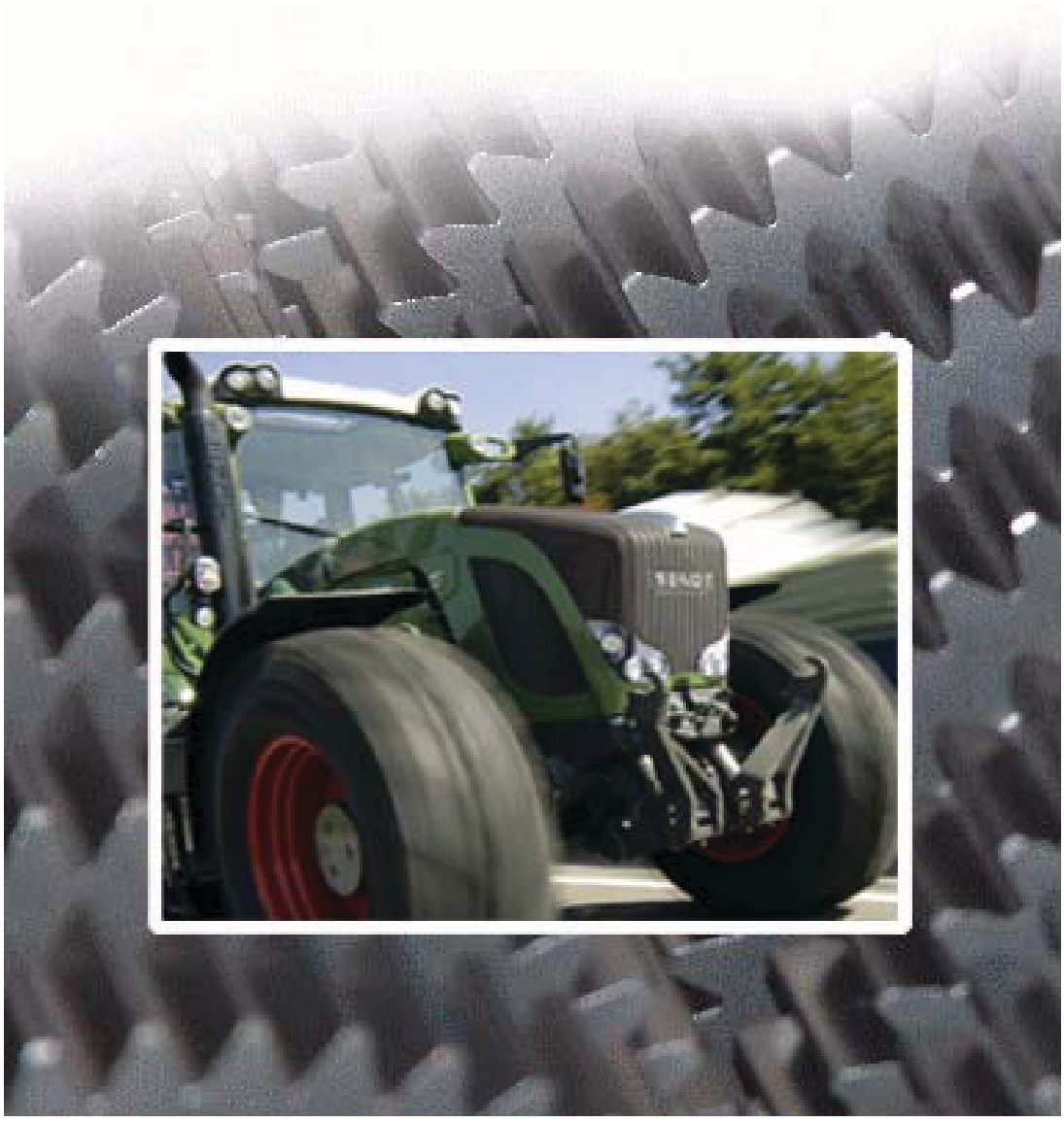
Workshop Service Manual

FENDT 900 Vario - COM III

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922 .. 0101-1000
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AGCO GmbH - Johann-Georg-Fendt-Str. 4 D-87616 Marktoberdorf
FENDT is a worldwide brand of AGCO

Edition 02/2010
No. X990.005.057.012
3510 G - en
FENDT 900 Vario COM III - EAME
English

FENDT

Volume 3

All relevant accident prevention regulations and all generally accepted safety, health and road traffic regulations must be strictly observed. The manufacturer does not accept liability for damage resulting from unauthorised modifications.

Changes and additions reserved**!**

FENDT 900 Vario - COM III

Unkt Id 0

0000 Overall system/tractor
1005 Overall system/transmission
1010 Transmission/differential
1015 Transmission/axle drive
1050 Transmission/housing
1070 Transmission / Brake system
1080 Transmission/drive train
1200 Transmission/front PTO
1220 Transmission / Live PTO
1320 Transmission/front wheel drive
2000 Overall system/engine
2010 Engine/cylinder head
2050 Engine/cooling
2060 Engine/fuel system
2210 Engine/crankcase
2312 Engine/lubrication
2400 Engine/exhaust system
2712 Engine/injectors
3000 Overall system/front axle
3120 Front axle/steering cylinder
3180 Front axle/cardan shaft

Unkt Id 1

4000 Overall system/steering
4090 Steering system / hydraulic steering unit
5030 Vehicle layout/operator's seat
5500 Overall system/air conditioning system
8100 Overall system/cab
8610 Power lift/EPC electro-hydraulic control
8631 Power lift/hydraulic lift
8800 Overall system/compressed air system

Unkt Id 2

9000 Overall system/electrical system
9015 Electrical system/starter lockout

Unkt Id 3

9410 Hydraulic pump installation/LS pump
9430 Hydraulic pump installation/steering pump
9534 Hydraulic piping/"Rüfa"reverse operation
9600 Overall system/hydraulic equipment
9605 Hydraulic equipment/hydraulic connections
9610 Hydraulic equipment/central control block (ZSB)
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9920 Service/special tools
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E Measuring and testing

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1 A007 instrument panel

Connect X899.980.208.100 e-adapter box to the A007 instrument panel using X899.980.208.204 adapter cable	
Pin at separation point	Pin on the adapter box (68-pin)
X101 separation point "yellow" (1 to 26)	1 to 26
X100 separation point "blue" (1 to 26)	31 to 56

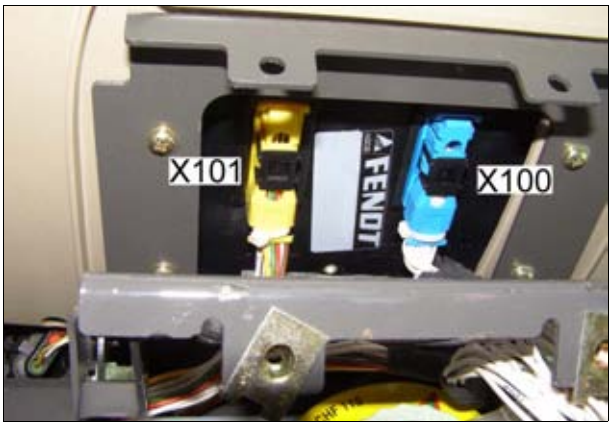


Fig. 1. I001226

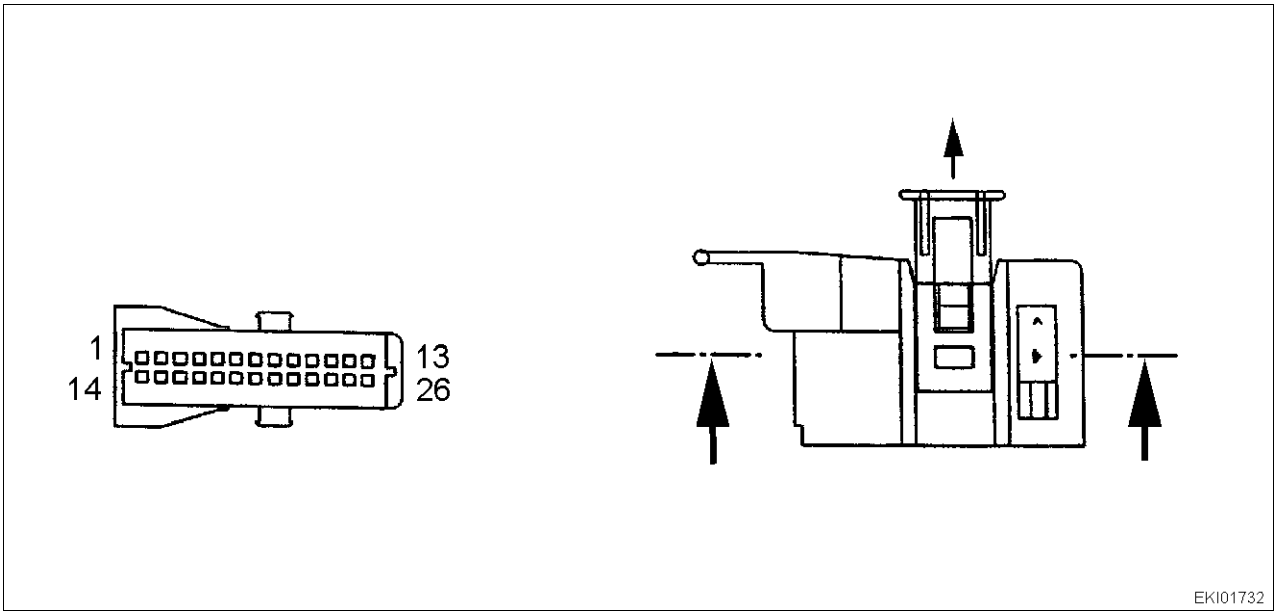


Fig. 2. Plan view onto the handle shell (connector) I000680

Testing supply voltage (+ UB 30) for the A007 instrument panel

X101 separation point "yellow" +UB 30 (battery voltage)				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
+ supply	8	12.0 VDC	Engine OFF, Ignition OFF	Fuse (F33) in X1440 fuse holder or in wiring set (see also electrical wiring diagram for electronics supply)
		14.0 VDC	Engine is running	
Electronics earth	12			
+ supply	8	Voltage drop max. 1 VDC from last reading	Also connect approx. 55 W bulb	Voltage must remain stable even under load. If voltage drop is greater than approx. 1 VDC, remove contact resistors (e.g. at fuse).
Electronics earth	12			

Testing supply voltage (+ UB 15) for the A007 instrument panel

X101 separation point "yellow" +UB 15 (switched voltage, ignition switch)				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
+ supply	9	0 VDC	Ignition OFF	Fuse (F36) in X1440 fuse holder or in wiring set (see also electrical wiring diagram for electronics supply)
		14.0 VDC	Ignition ON.	
Electronics earth	12			
+ supply	9	Voltage drop max. 1 VDC from last reading	Also connect approx. 55 W bulb	Voltage must remain stable even under load. If voltage drop is greater than approx. 1 VDC, remove contact resistors (e.g. at fuse).
Electronics earth	12			

NOTE: *If voltage drop is greater than approx. 1 VDC, remove contact resistors (e.g. at fuse).*

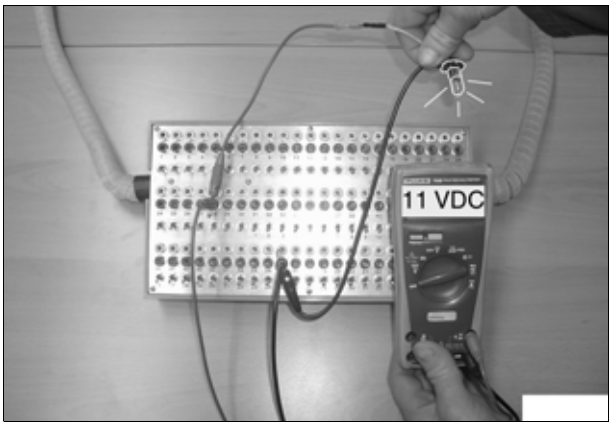


Fig. 3. I000586

Battery voltage

Test positive and negative terminals of the G001 battery using a multimeter (voltmeter).

Diesel engine not running = approx. 12 VDC

Start diesel engine = approx. 8 VDC (M001 starter draws current)

Diesel engine running = approx. 13.8 VDC (G002 alternator 1 and G004 alternator 2 generate charging current)



Fig. 4. I001104

NOTE:

- *The following measurements are from separation point X100 "blue"*
- *Pin 12 earth, X101 separation point, "yellow"*
- *Ignition on*
- *All measurements ± 10%*

Pin	description	condition	Signal Specified value	Wire interrupted: Signal from ECU	Wire interrupted: Signal from component
1	Not assigned				
2	Not assigned				
3	Not assigned				
4	**Charging indicator lamp, G002 alternator 1 (D+)**				
	Ignition ON, engine OFF	Charging indicator lamp is on	1.4 VDC	11.4 VDC	0.4 VDC
	Ignition ON, engine running	Charging indicator lamp is off	14 VDC	13 VDC	14 VDC
5	Not assigned				
6	Not assigned				
7	Not assigned				
8	**H006 - Audio warning signal (loud)**				
	Ignition ON.	Buzzer (loud) ON	12 VDC pulse	12 VDC pulse	0 VDC
9	**H006 - Audio warning signal (quiet)**				
	Ignition ON.	Buzzer (low) ON	12 VDC pulse	12 VDC pulse	0 VDC
10	**X007 - Implement socket** **Rear PTO speed**, Ignition ON.				
		Engine off	12 VDC	12 VDC	0 VDC
		Engine is running, rear PTO setting preselected, **Rear PTO disengaged**	14 or 0 VDC	14 or 0 VDC	0 VDC
		Engine is running, rear PTO setting preselected, **Rear PTO engaged**	approx. 6.5 VDC (UBatt/2)	approx. 6.5 VDC (UBatt/2)	0 VDC
11	**X007 - Implement socket** **Theoretical travel speed** Ignition ON.				
		Engine off, speed 0 km/h	12 VDC	12 VDC	0 VDC
		Engine is running, Speed 0 km/h	14 VDC	14 VDC	0 VDC
		Engine is running, speed higher than 1.0 km/h	approx. 6.5 VDC (UBatt/2)	approx. 6.5 VDC (UBatt/2)	0 VDC
12	**X007 - Implement socket** **Actual travel speed** (A011 radar sensor) Ignition ON.				
		Engine OFF, Speed 0 km/h	12 VDC	12 VDC	0 VDC
		Engine is running, Speed 0 km/h	14 VDC	14 VDC	0 VDC

Pin	description	condition	Signal Specified value	Wire interrupted: Signal from ECU	Wire interrupted: Signal from component
		Engine is running, speed higher than 1.0 km/h (approx. 130 pulses per metre travelled)	approx. 6.5 VDC (UBatt/2)	approx. 6.5 VDC (UBatt/2)	0 VDC
13	**Control bus (CAN low)** Note: end resistor in the A013 PCB (120 ohms) and in the A007 instrument panel (120 ohms)	Ignition OFF, measure resistance between CAN low (pin 13) and CAN high (pin 26)	**Version A: to 9../../1700 approx. 40 ohms** 3x 120 ohms parallel Terminating resistances: 120 ohms **A007** - Instrument panel 120 ohms **A013** - PCB, microfuses 120 ohms **A038** - ECU, central electrical system **Version B: from 9../../1701 approx. 60 ohms** 2x 120 ohms parallel Terminating resistances: 120 ohms **A007** - Instrument panel 120 ohms **A013** - PCB, microfuses		
		Ignition ON, voltage level between CAN low (pin 13) and vehicle earth.	approx. 2.4 VDC	approx. 2.5 VDC	approx. 3.3 VDC
14	Not assigned				
15	**X007 - Implement socket** **Lifting gear status** Ignition ON, Engine is running	Quick lift switch:			
		Lower (control/float)	0 VDC	0 VDC	0 VDC
		Stop	0 VDC	0 VDC	0 VDC
		Raise	14 VDC	14 VDC	0 VDC
16	**B013 - Sensor, hydraulic oil temperature** Ignition ON, Engine is running	Temperature approx. 15°C	2.1 VDC	4.8 VDC	0 VDC
		Temperature higher than 102°C (approx. 170 ohms) (Warning message)	248 mVDC	4.8 VDC	0 VDC
17	Not assigned				
18	**B019 - Sensor, compressed air supply**			9.6 VDC (ignition ON) or 11.6 VDC (engine running)	0 VDC

Pin	description	condition	Signal Specified value	Wire interrupted: Signal from ECU	Wire interrupted: Signal from component
	Ignition ON.	Compressed air display "red zone" (1 bar flashing) (resistance = 20 ohms)	0.34 VDC		
		Compressed air display "Switch-off pressure" (9 bars) (resistance = 96 ohms)	1.57 VDC		
19	**S076 - Switch, clutch fluid (X902.011.622 Pentosin)** Ignition ON.	Clutch fluid (Pentosin) too low Float at bottom S076 switch closed "Warning message"	0 VDC	0 VDC	0 VDC
		Clutch fluid (Pentosin) OK Float at top S076 switch open	12 VDC	12 VDC	0 VDC
20	Not assigned				
21	**X1048 - Socket ABS(Indicator lamp)** Ignition ON. Note: When ignition is OFF/ON or an ABS implement is connected, the ABS indicator lamp lights up briefly (indicator lamp function test)	ABS system on implement is OK	12 VDC	12 VDC	0 VDC
		Fault in the ABS system (implement): The implement switches earth on pin 5 in the X1048 socket, ABS (ABS indicator lamp lights up)	0 VDC	12 VDC	0 VDC
22	**X007 - Implement socket** **Lifting gear position** Ignition ON, engine running	Rear power lift, lower limit position	0 VDC	0 VDC	0 VDC
		Rear power lift, upper limit position	10 VDC	10 VDC	0 VDC
23	Not assigned				
24	**Charging indicator lamp, G004 alternator 2 (D+)** Ignition ON, engine OFF	Charging indicator lamp is on	1.4 VDC	11.4 VDC	0.4 VDC
	Ignition ON, engine running	Charging indicator lamp is off	14 VDC	13 VDC	14 VDC
25	Not assigned				

Pin	description	condition	Signal Specified value	Wire interrupted	
				Signal from ECU	Signal from component
26	**Control bus (CAN high)** Note: end resistor in the A013 PCB (120 ohms) and in the A007 instrument panel (120 ohms)	Ignition OFF, measure resistance between CAN low (pin 13) and CAN high (pin 26)	**Version A: to 9../../1700** **approx. 40 ohms** 3x 120 ohms parallel Terminating resistances: 120 ohms **A007** - Instrument panel 120 ohms **A013** - PCB, microfuses 120 ohms **A038** - ECU, central electrical system **Version B: from 9../../1701** **approx. 60 ohms** 2x 120 ohms parallel Terminating resistances: 120 ohms **A007** - Instrument panel 120 ohms **A013** - PCB, microfuses		
		Ignition ON, measure voltage between CAN high (pin 26) and earth (X101, pin 12)	2.5 VDC	2.6 VDC	1.6 VDC

NOTE:
- *The following measurements are from separation point X101 "yellow"*
- *Pin 12 earth, X101 separation point, "yellow"*
- *Ignition on*
- *All measurements ± 10%*

Pin	description	condition	Signal Specified value	Wire interrupted	
				Signal from ECU	Signal from component
1	**A036 - Control panel, dashboard right/left**			5.0 VDC	0 VDC
	"Enter" button				
		"Enter" button not depressed	1.7 VDC		
		"Enter" button depressed	0.5 VDC		
2	**A036 - Control panel, dashboard right/left**			5.0 VDC	0 VDC
	"ESC" button				
		"ESC" button not depressed	1.7 VDC		
		"ESC" button depressed	0.5 VDC		
3	**A036 - Control panel, dashboard right/left**			5.0 VDC	0 VDC
	"Cursor up" button				

Pin	description	condition	Signal Specified value	Wire interrupted: Signal from ECU	Wire interrupted: Signal from component
		"Cursor up" button not depressed	1.7 VDC		
		"Cursor up" button depressed	0.5 VDC		
4	**A036 - Control panel, dashboard right/left**			5.0 VDC	0 VDC
	"Cursor down" button				
		"Cursor down" button not depressed	1.7 VDC		
		"Cursor down" button depressed	0.5 VDC		
5	**Analogue earth (sensor system earth)**	-	-	-	-
6	Not assigned				
7	Not assigned				
8	**+ supply (+ UB 30)**				
	(battery voltage)				
		Ignition OFF	12 VDC	0 VDC	12 VDC
		Ignition ON, engine running	14 VDC	0 VDC	14 VDC
9	**+ supply (+ UB 15)**				
	(switched voltage)				
		Ignition OFF	0 VDC	0 VDC	0 VDC
		Ignition ON, engine OFF	12 VDC	0 VDC	12 VDC
		Ignition ON, engine running	14 VDC	0 VDC	14 VDC
10	Not assigned				
12	**Digital earth (electronics earth)**	-	-	-	-
13	**+ UB 12 VDC (sensor system)**				
		Ignition OFF	0 VDC	0 VDC	0 VDC
		Ignition ON.	12 VDC	12 VDC	0 VDC
14…19	Not assigned				
20	**Analogue earth (sensor system earth)**	-	-	-	-
21	**B034 - Immersed tube sensor (fuel)**			9.6 VDC (ignition ON) or 11.6 VDC (engine running)	0 VDC
		Fuel gauge "Empty" (1 bar flashing) (resistance = 20 ohms)	0.2 VDC		
		Fuel gauge "1/2" (8 bars) (resistance = 340 ohms)	3.2 VDC		
		Fuel gauge "1/1" (12 bars) (resistance = 500 ohms)	4.8 VDC		

Pin	description	condition	Signal Specified value	Wire interrupted	
				Signal from ECU	Signal from component
22	**IB084 - Sensor, hydraulic oil level**			9.6 VDC (ignition ON) or 11.6 VDC (engine running)	
		Hydraulic oil gauge "Empty" (1 bar and warning message) (resistance = 20 ohms)	0.2 VDC		
		Hydraulic oil gauge "1/2" (8 bars) (resistance = 340 ohms)	3.2 VDC		
		Hydraulic oil gauge "1/1" (12 bars) (resistance = 500 ohms)	4.8 VDC		
23	Not assigned				
24	**B060 - Compressed air supply sensor**			9.6 VDC (ignition ON) or 11.6 VDC (engine running)	0 VDC
	Ignition ON.	Compressed air gauge "red zone" (1 bar flashing) (resistance = 20 ohms)	0.34 VDC		
		Compressed air gauge "Switch-off pressure" (9 bars) (resistance = 96 ohms)	1.57 VDC		
25	Not assigned				
26	Not assigned				

2 A009 actuator unit

Pin	Function
1	Not assigned
2	CAN high (Transmission bus)
3	Reference F/R (Forward/reverse)
4	+ UB 30
5	CAN low (Transmission bus)
6	+UB from A050 ECU, basic control unit
7	Digital earth
8	Tractor earth



Fig. 5. I002360

Check A009 actuator unit

NOTE: *Connect X899.980.246.207 adapter cable to X037 separation point*

Switch on ignition.

Check the +supply from the electric motor for the A009 - Actuator unit

Test	Pin	Specified value	condition	Possible cause of fault
Supply to electric motor	4	12 to 14 VDC	+ UB 30	Checking fuse F3 in X1440
Earth	8			
Supply to electric motor	4	Voltage drop max. 1 VDC from last reading	Also connect approx. 55 W bulb	Voltage must remain stable even under load
Earth	8			

NOTE: *If voltage drop is greater than approx. 1 VDC, remove contact resistors (e.g. at fuse)*



Fig. 6. I002361

Check the electronic control of the A009 - Actuator unit

Test	Pin	Specified value	condition	Possible cause of fault
+UB from A050 ECU, basic control unit	6	12 to 14 VDC		
Digital earth	7			
Reference F/R (Forward/reverse)	3	1.8 VDC or 3.7 VDC	Ignition ON. Slowly turn A009 actuator unit by hand. The voltage signal must alternate between 1.8 VDC and 3.7 VDC.	
Digital earth	7			
CAN high (Transmission bus)	2	60 ohms	Ignition OFF	Reading: 120 ohms Fault in: - **A009** - Actuator unit - **A013** - PCB, microfuses - Wiring set
CAN low (Transmission bus)	5			

Check the A009 - Actuator unit (sluggishness or defect in electric motor)

Connect multimeter (ammeter)

Pull fuse F3 and connect multimeter (measuring range min. 3 amps) between the pins

NOTE: *Connect adapter cable with floating fuse (in-house production)*



Fig. 7. I002363

Connect multimeter (voltmeter)

Connect X899.980.246.207 adapter cable (8-pin) to **X037** - Separation point on A009

Measure pin 4 (+UB 30) and **pin 8 (earth)**



Fig. 8. I002360

The transmission position (arrow) can be observed via the diagnostics program (FENDIAS).
The adjustment angle of any fault occurring can be detected

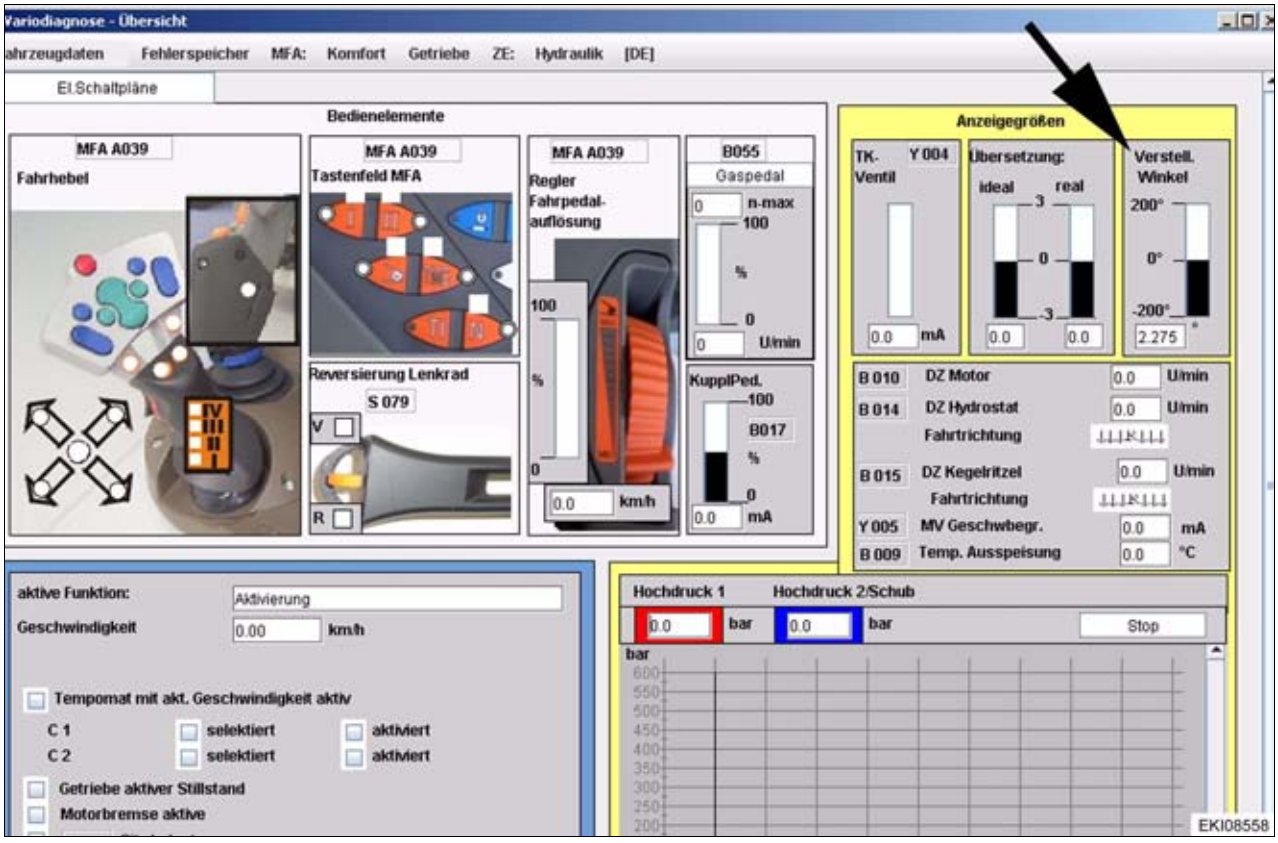


Fig. 9. I002372

Maximum gear ratio "forwards" (approx. 166.5° adjustment angle)

Maximum gear ratio "reverse" (approx. -120.6° adjustment angle)

Set the transmission to neutral

Option A: Manual

A = travel range selector
B = emergency operation of A009 transmission control unit

In neutral (N),
The arrow must line up with the mark (see arrow)

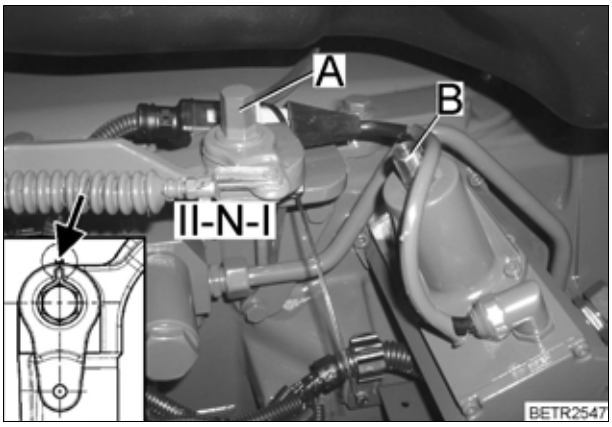


Fig. 10. I002364

Option B: Via calibration code 4003

Once the travel range selector has been calibrated (calibration code 4003), the transmission moves to neutral.

If calibration is error-free, the travel range selector will be in neutral (N).

NOTE: *see §13*

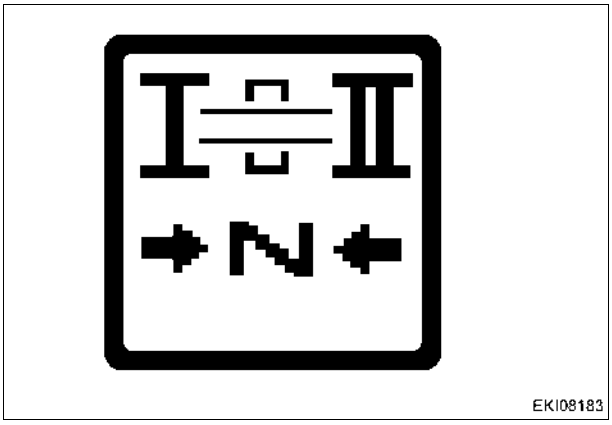


Fig. 11. I001009

Select **acceleration rate I** on the acceleration switch on the joystick

Set the lowest acceleration rate on the A007 instrument panel

Smallest acceleration rate = 0,02 Km/h

NOTE: *See also: Operating Manual*

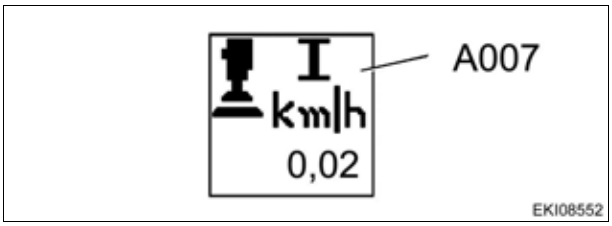


Fig. 12. I002365

Activate neutral key N (A) (LED (B) OFF)

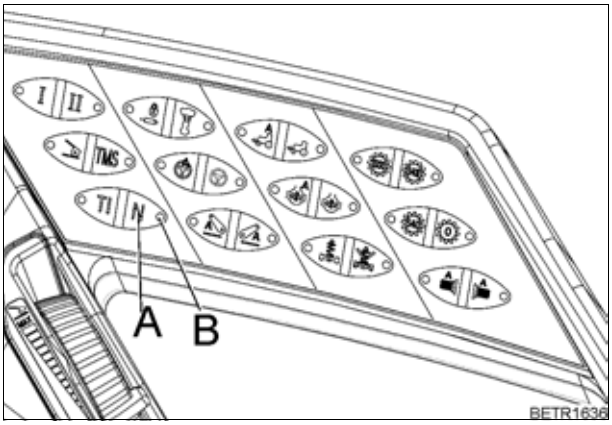


Fig. 13. I000686

The tractor is set to "Active Stationary"

Travel direction displays (A) light up

Warning light (B) flashes

ACTIVE symbol (C) is displayed on the multiple display

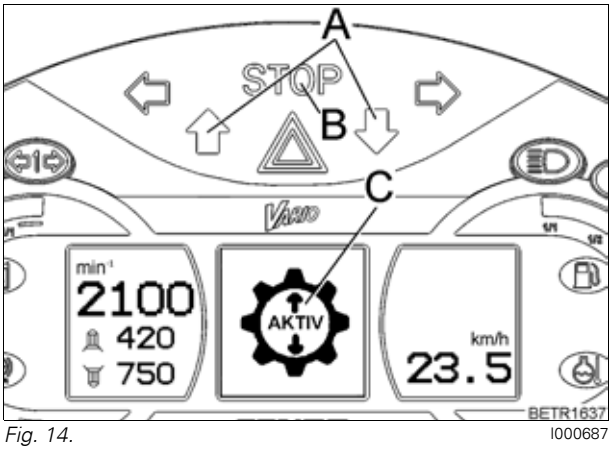


Fig. 14. I000687

Transmission adjustment on the joystick

A - forward transmission ratio.

B - reverse transmission ratio.

Tractor in "ACTIVE Stationary"
Set engine speed to approx. 1400 rpm
Press activation button (on rear of joystick), push joystick forwards (A) and hold.

Transmission ratio will adjust towards forwards until either the maximum setting is reached or a fault occurs

Tractor in "ACTIVE Stationary"
Set engine speed to approx. 1400 rpm
Press activation button (on rear of joystick), pull joystick backwards (B) and hold.

Transmission ratio will adjust towards backwards until either the maximum setting is reached or a fault occurs

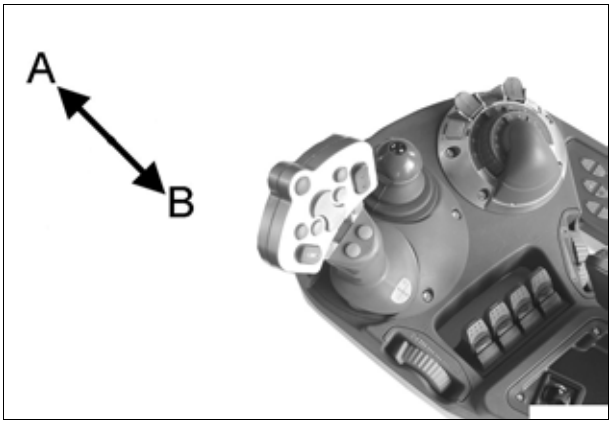


Fig. 15. I002366

NOTE: *The transmission ratio can be viewed on the terminal see §10*

Check voltage:

Setpoint value during the adjustment operation: constant. 14 VDC



Fig. 16. I002360

Check current draw (amps):

Setpoint value during the adjustment operation:
approx. **100 mA DC to 400 mA DC**
(heavily temperature-dependant)

NOTE: *The display of the measuring device will jump*



Fig. 17. I002363

Potential electrical effects during testing of the A009 actuator unit and their possible causes		
Voltage constant and current (amps) tending toward zero	Yes -->	Replace A009 actuator unit (electric motor in actuator unit faulty)
No		
Voltage dips	Yes -->	Check power supply to A009 actuator unit (+ UB 30)

Potential electrical effects during testing of the A009 actuator unit and their possible causes		
No		
Voltage (V) constant and current (A) rising (up to 2500 mADC)	Yes –>	a) A009 actuator unit becomes sluggish. Unscrew dome from actuator unit and refit. Replace A009 actuator unit if necessary
		b) Transmission adjusting shaft sluggish. Carefully (without twisting the actuator shaft) remove the A009 actuator unit. Using two fingers, check the actuator shaft for sluggishness.

NOTE: *see §3*

3 A011 radar sensor (optional)

Functional description of the electronic slip control system
see §1

Calibrating speed display
see §19

Adjusting electronic slip control
See the operator's manual

A011 = radar sensor



At the left entry, under the transmission housing



Fig. 18. I002938

Circuit diagram: **A011** - Radar sensor

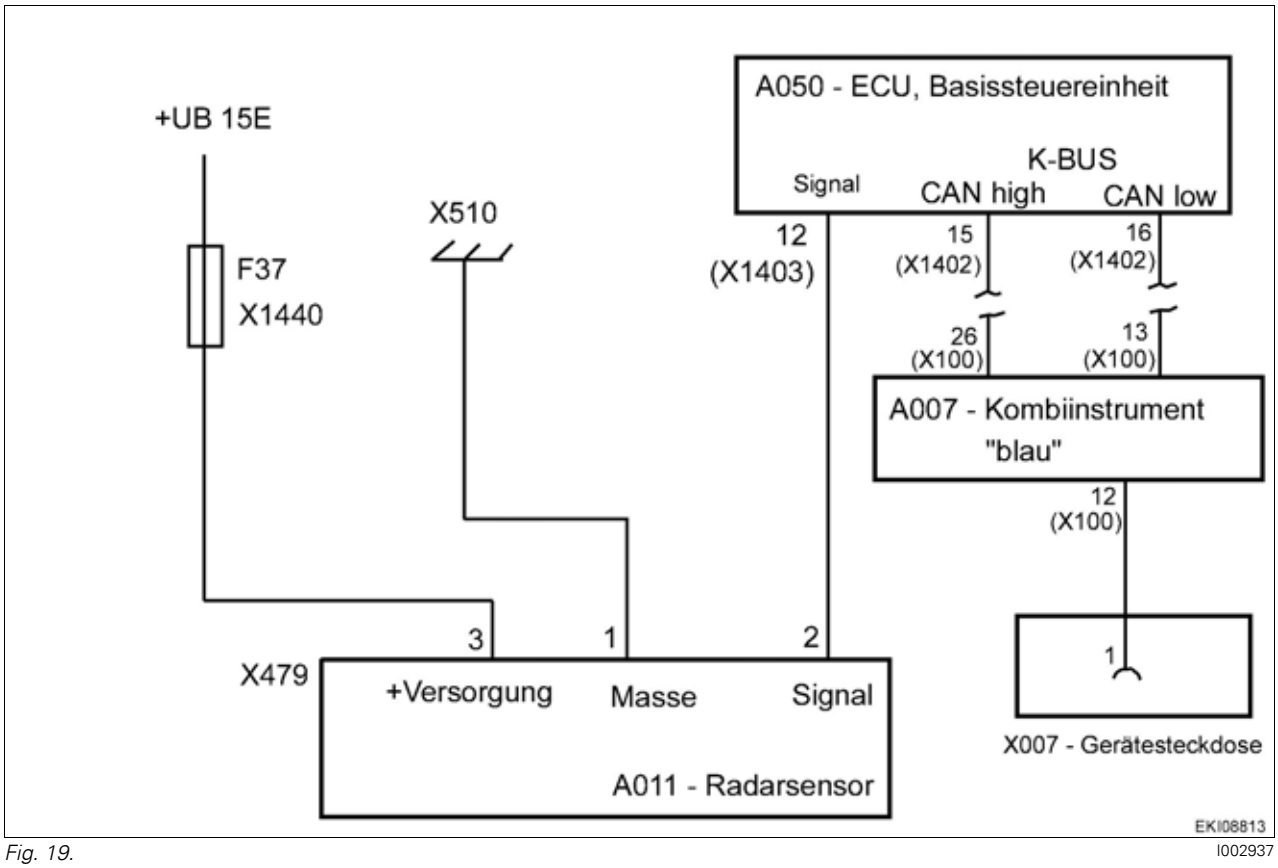


Fig. 19. I002937

Item	Designation	Note
A011	**Radar sensor**	
X479	Separation point	
Pin 1	Earth	

Item	Designation	Note
Pin 2	Signal	
Pin 3	+ supply	Ignition ON.
A007	**Instrument panel**	
X100	Separation point, "blue"	
Pin 12	Signal	
Pin 13	Control bus_low	
Pin 26	Control bus_high	
A050	**ECU, basic control unit**	
X1402	Separation point	
X1403	Separation point	
Pin 12 (on X1403)	Signal	
Pin 16 (on X1402)	Control bus_low	
Pin 15 (on X1402)	K bus	
X007	Implement socket	
X510	Earth pin	

Measuring point and signal values

Measuring points on A050 - ECU, basic control unit	
Pin	**Function**
12 (on X1403)	Signal
22 (on X1403)	Earth



Fig. 20. I001668

Assignment on X899.980.304.000 adapter box
Connect the X899.980.304.000 adapter box and the X899.980.304.201 adapter cable to the **A050** - ECU, basic control unit and measure the pins (see table).

Measuring points on A011 - Radar sensor (X479 separation point)	
Pin	**Function**
1	Earth
2	Signal
3	+ supply



Fig. 21. I002938

Signal on A011 - Radar sensor (with 45° angle of approach)	
Pulses (radar constant K)	113 pulses/m
Frequency (Hz)	Frequency = v (km/h) x K (113 pulses/m) / 3.6
Average voltage (VDC)	See table below

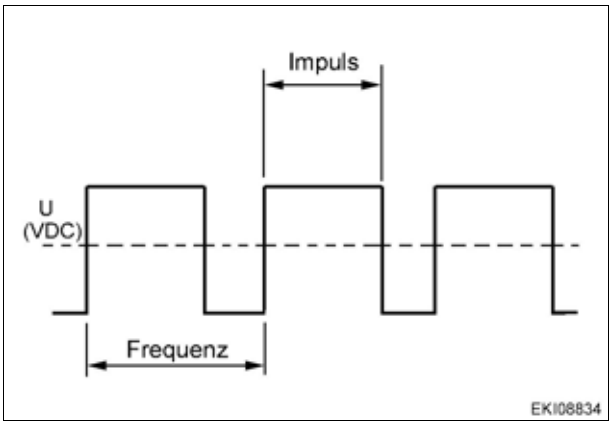


Fig. 22. I002939

Measurement on A011 - Radar sensor				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
+ supply	3	12 VDC		Fuse F37 in X1440 or within wiring set
Earth	1			
Signal	2	Approx. 0.2 VDC	Tractor drives slower than 0,1 Km/h	
		Approx. 4.6 VDC	Tractor driving faster than 0,1 Km/h	
Earth	1			

Signal on the "black" X007 - Implement socket

The **X007** - Implement socket (7-pin) delivers signals for the operation of towed and mounted implements.
For example: Speed signals for the operation of a sprayer computer.



Cab, C-pillar, top right



Fig. 23. I001191

Pin assignment on the X007 - Implement socket

1 = actual road speed(**A011** - Radar sensor, by request)
(130 pulses per metre travelled)

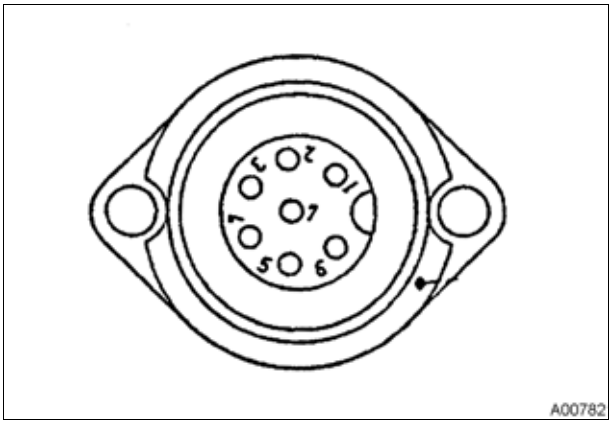


Fig. 24. I002748

Measurement on the X007 - Implement socket				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
Signal	1	Approx. 14 VDC	Tractor drives slower than 0,1 Km/h	
		approx. 6.5 VDC (UBatt/2)	Tractor driving faster than 0,1 Km/h	
Earth	7			

4 A013 PCB, microfuse

Using the X899.980.208.207 adapter cable, connect the X899.980.208.100 e-adapter box (68-pin) directly to the A013 - PCB, microfuses	
Pin at separation point	**Pin on X899.980.208.100 adapter box (68-pin)**
"Black connector" (1 to 18)	31 to 48

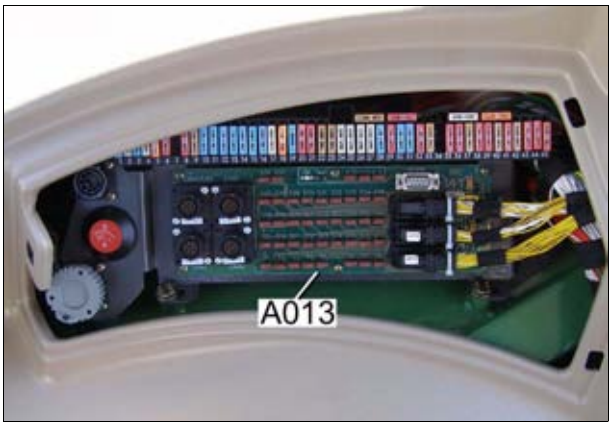


Fig. 25. I001142

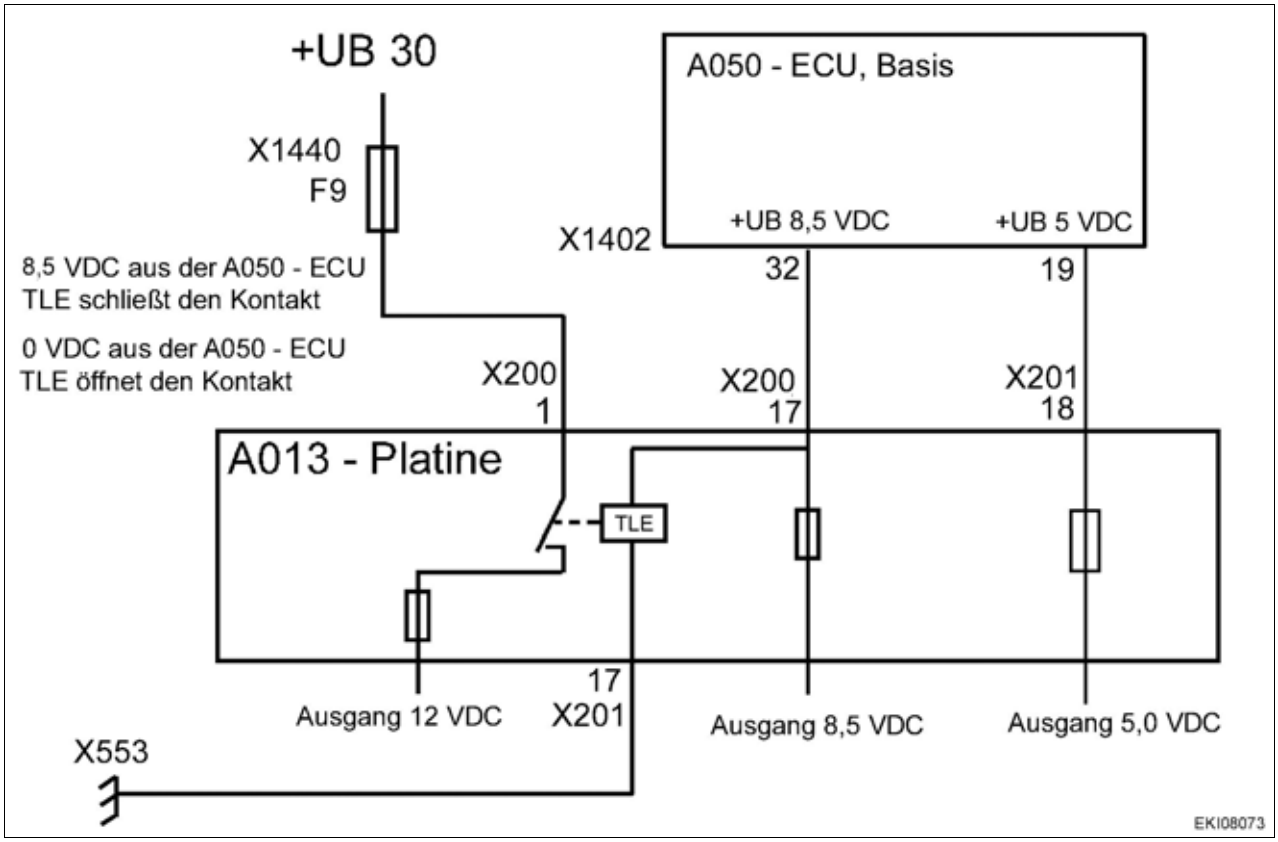


Fig. 26. I002328

Item	Designation	Note
A013	PCB, microfuse	
X200	Separation point on A013	
X201	Separation point on A013	
Pin 1 (X200)	+ supply for the A013 PCB (12 VDC)	

Item	Designation	Note
Pin 17 (X200)	+ supply for the **A013** - PCB, microfuses (8.5 VDC)	Switch ignition ON. The **A050** - ECU, basic control unit provides 8.5 VDC to the **A013** - PCB, microfuses . The 8.5 VDC supplies: – Microfuses (8.5 VDC) - TLE switch The TLE switch switches 12 VDC to the microfuses (12 VDC)
Pin 18 (X201)	+ supply for the **A013** - PCB, microfuses (5.0 VDC)	Switch ignition ON. The **A050** - ECU, basic control unit provides 5.0 VDC to the **A013** - PCB, microfuses The 5.0 VDC supply: - Microfuses (5.0 VDC)
Pin 17 (X201)	Earth	
A050	ECU, basic control unit	
X1402	Separation point on A050	
Pin 19	+ UB 5.0 VDC	Ignition ON.
Pin 32	+ UB 9.0 VDC	Ignition ON.
X553	Earth pin	
X1440	Fuse holder	Fuse F9 (+ UB 30)

Measuring the supply voltage for the A013 - PCB, microfuses

+supply (8.5 VDC)		condition	Signal Specified value	Break in wiring	
Pin	description			Signal from ECU	Signal from component
17 (X200)	**+supply (8.5 VDC)**	Ignition ON.	8.5 VDC	8.5 VDC	0 VDC
	Vehicle earth				

+ supply 5.0 VDC		condition	Signal Specified value	Break in wiring	
Pin	description			Signal from ECU	Signal from component
18 (X201)	**+ supply 5.0 VDC**	Ignition ON.	5.0 VDC	5.0 VDC	0 VDC
	Vehicle earth				

+ supply 12 VDC (+ UB 30)				
Test	Pin	Specified value	condition	Possible cause of fault
+ supply	1 (X200)	12.0 VDC	Ignition OFF	Fuse (F9) in **X1440** - Fuse holder or in wiring set
		14.0 VDC	Engine is running	
Vehicle earth				

+ supply 12 VDC (+ UB 30)				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
+ supply	1 (X200)	Voltage drop max. 1 VDC from last reading	Also connect approx. 55 W bulb	Voltage must remain stable even under load. If voltage drop is greater than approx. 1 VDC, remove contact resistors (e.g. at fuse).
Vehicle earth				

NOTE: *If voltage drop is greater than approx. 1 VDC, remove contact resistors (e.g. at fuse).*

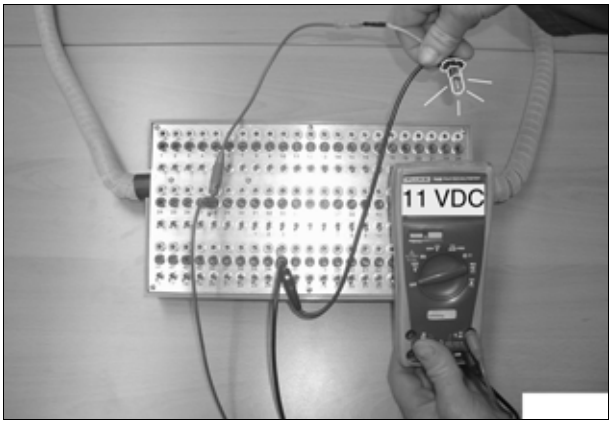


Fig. 27. I000586

Fuses (X200 separation point) "area A"			
Vehicle earth			
Pin	**Fuse**	**Specified value**	**Component**
1	-	12 VDC	+ UB 30 (fuse F9)
2	-	approx. 2.5 VDC	Control bus_Low
3	-	approx. 2.6 VDC	Control bus_High
Ignition OFF, measure 2 and 3. Measure	-	approx. 40 ohms	**Control bus (version A) to 9../../1700** 3x 120 ohms parallel Terminating resistance: 120 ohms **A007** - Instrument panel 120 ohms **A013** - PCB, microfuses 120 ohms **A038** - ECU, central electrical system
Ignition OFF, measure 2 and 3. Measure	-	approx. 60 ohms	**Control bus (version B) from 9../../1701** 2x 120 ohms parallel Terminating resistance: 120 ohms **A007** - Instrument panel 120 ohms **A013** - PCB, microfuses
4	S 15	8.5 VDC	**B030** - Sensor, rear power lift position
5	S 14	8.5 VDC	**B031** - Sensor, draft sensing pin, right
6	S 13	8.5 VDC	**B032** - Sensor, draft sensing pin, left
7	S 12	8.5 VDC	**B040** - Sensor, front power lift position
8	-	-	-
9	-	-	-
10	S 8	8.5 VDC	**B015** - Sensor, bevel pinion
11	S 7	8.5 VDC	**B014** - Sensor, collecting shaft
12	S 6	8.5 VDC	**B016** - Sensor, travel range detection

Fuses (X200 separation point) "area A"			
Vehicle earth			
Pin	**Fuse**	**Specified value**	**Component**
13	S 5	8.5 VDC	**B017** - Sensor, clutch pedal
14	S 4	8.5 VDC	X015 socket, external control (pin 58 R)
15	-	-	-
16	-	-	-
17	-	8.5 VDC	+UB 8.5 VDC from the A050 ECU, basic control unit
18	-	-	-

Fuses (X201 separation point) "area B"			
Vehicle earth			
Pin	**Fuse**	**Specified value**	**Component**
1	S 9	8.5 VDC	**B068** - Sensor, wheel position (right)
2	-	approx. 2.3 VDC	Transmission-bus_Low
3	-	approx. 2.6 VDC	Transmission bus_High
Ignition OFF, measure 2 and 3. Measure	-	approx. 60 ohms	**Transmission bus** 2x 120 ohms parallel Terminating resistance: 120 ohms **A009** - Actuator unit 120 ohms **A013** - PCB, microfuses
4	S 16	8.5 VDC	**B067** - Sensor, steering angle
5	S 17	8.5 VDC	**B066** - Sensor, wheel position (left)
6	-	-	-
7	S 19	8.5 VDC	**B055** - Sensor, foot throttle
8	-	-	-
9	-	-	-
10	-	-	-
11	-	-	-
12	-	-	-
13	-	-	-
14	-	-	-
15	-	-	-
16	-	-	-
17	-	-	Electronics earth
18	-	5.0 VDC	+UB 5.0 VDC from the **A050** - ECU, basic control unit

Fuses (X202 separation point) "area C"			
Vehicle earth			
Pin	**Fuse**	**Specified value**	**Component**
1	S 33	12.0 VDC	**B010** - Sensor, engine speed (for controlling ML transmission)
2	-	approx. 2.2 VDC	Valve bus_Low)
3	-	approx. 2.4 VDC	Valve bus_High)
Ignition OFF, measure 2 and 3. Measure	-	approx. 60 ohms	**Valve bus** 2x 120 ohms parallel Terminating resistance: **A013** - PCB, microfuses (120 ohms) **X1491** - Rear V bus terminal (120 Ω)
4	S 32	12.0 VDC	**B008** - Sensor, high-pressure 1
5	S 31	12.0 VDC	**B039** - Sensor, high-pressure 2
6	-	-	-
7	S 29	12.0 VDC	**B081** - Steering wheel sensor (360°) (for Auto-Guide only)
8	-	-	-
9	S 36	12.0 VDC	**B002** - Sensor, front PTO speed
10	S 35	12.0 VDC	**B020** - Sensor, rear PTO speed (stub shaft)
11	S 34	12.0 VDC	**B021** - Sensor, rear PTO speed (clutch)
12		approx. 2.5 VDC	ISO bus_Low In
13		approx. 2.5 VDC	ISO bus_Low Out
14		approx. 2.6 VDC	ISO bus_High In
15		approx. 2.6 VDC	ISO bus_High Out
Ignition OFF, measure 12 and 14 Measure		approx. 80 ohms	**ISO bus**
16		12 VDC	ISO bus terminal, bus on
17			Serial RXD (receive) (A054 terminal)
18			Serial TXD (send) (A054 terminal)

NOTE: *see §20*

5 A036 control panel, right/left instrument panel

Using the X899.980.208.207 adapter cable, connect the X899.980.208.100 e-adapter box (68-pin) directly to the X1357 [weiß] - Separation point on A036	
Pin at separation point	**Pin on X899.980.208.100 adapter box (68-pin)**
"Black connector" (1 to 18)	31 to 48



Fig. 28. I007383

Using the X899.980.208.207 adapter cable, connect the X899.980.208.100 e-adapter box to the **X1357 [weiß]** - Separation point on A036



Fig. 29. I002343

Circuit diagram A036 (A037) dashboard

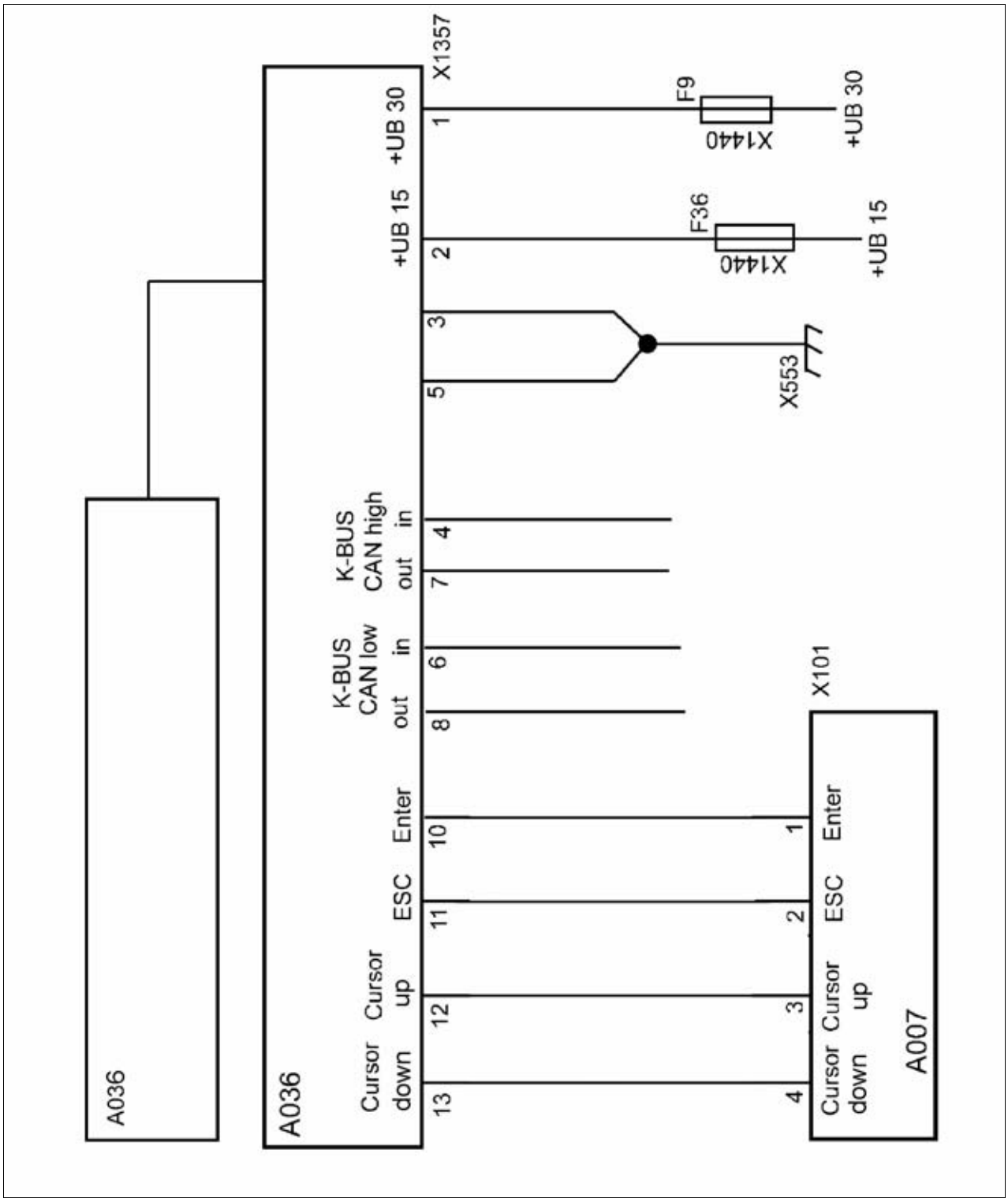


Fig. 30.

I007382

Measuring the supply voltage for the **A036** - Control panel, dashboard right/left

*Measuring the supply voltage (+UB 30) at **X1357 [weiß]** - Separation point on A036*

+ UB 30 (battery voltage)				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
+ supply	1	12.0 VDC	Ignition OFF	Fuse F9 in **X1440** - Fuse holder or in wiring set (see also electrical wiring diagram for electronics supply)
		14.0 VDC	Engine is running	
Earth	3			
+ supply	1	Voltage drop max. 1 VDC from last reading	Also connect approx. 55 W bulb	Voltage must remain stable even under load. If voltage drop is greater than approx. 1 VDC, remove contact resistors (e.g. at fuse).
Earth	3			

*Measuring the supply voltage (+UB 15) at **X1357 [weiß]** - Separation point on A036*

+ UB 15 (switched voltage, ignition switch)				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
+ supply	2	0 VDC	Ignition OFF	Fuse (F36) in **X1440** - Fuse holder or in wiring set (see also electrical wiring diagram for electronics supply)
		14.0 VDC	Ignition ON.	
Earth	3			
+ supply	2	Voltage drop max. 1 VDC from last reading	Also connect approx. 55 W bulb	Voltage must remain stable even under load. If voltage drop is greater than approx. 1 VDC, remove contact resistors (e.g. at fuse).
Earth	3			

NOTE: *If the voltage drop is greater than approx. 1 VDC, remove contact resistors (e.g. at fuse)*

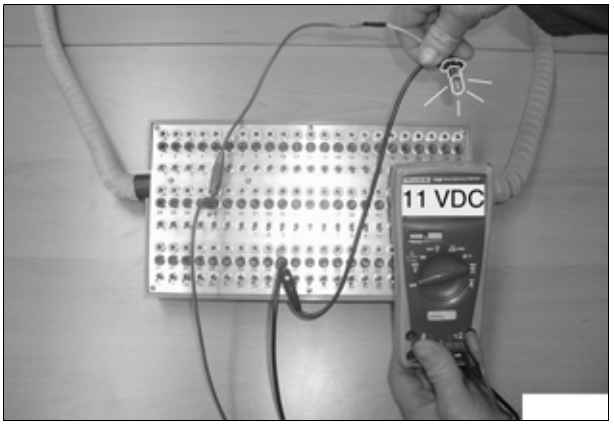


Fig. 31. I000586

Pin assignment and signal values

NOTE: *All readings +/- 10%*

Pin	description	condition	Signal Specified value	Wire interrupted: Signal from ECU	Wire interrupted: Signal from component
1	+ supply (+ UB 30)	Ignition off, engine off	12 VDC	0 VDC	12 VDC
		Engine is running	14 VDC	0 VDC	14 VDC
2	+ supply (+ UB 15)	Ignition OFF	0 VDC	0 VDC	0 VDC
		Ignition ON.	12 VDC	0 VDC	12 VDC
3	Earth	-	-	-	-
4	Control bus_High In	Ignition ON.	approx. 2.6 VDC	approx. 2.6 VDC	approx. 2.6 VDC
5	Electronics earth	-	-	-	-
6	Control bus_Low In	Ignition ON.	approx. 2.5 VDC	approx. 2.6 VDC	approx. 2.5 VDC
7	Control bus_High Out	Ignition ON.	approx. 2.6 VDC	approx. 1.7 VDC	approx. 2.6 VDC
8	Control bus_Low Out	Ignition ON.	approx. 2.5 VDC	approx. 3.4 VDC	approx. 2.4 VDC
4 and 6	Resistance (control bus)	Ignition OFF	**Version A = 40 ohms to 9../../1700** 3x 120 ohms parallel 120 ohms **A007** - Instrument panel 120 ohms **A013** - PCB, microfuses 120 ohms **A038** - ECU, central electrical system **Version B = 60 ohms from 9../../1701** 2x 120 ohms parallel 120 ohms **A007** - Instrument panel 120 ohms **A013** - PCB, microfuses **Note:** *see §6*		
7 and 8	Resistance (control bus)	Ignition OFF	**Version A = 40 ohms to 9../../1700** 3x 120 ohms parallel Terminating resistances: 120 ohms **A007** - Instrument panel 120 ohms **A013** - PCB, microfuses 120 ohms **A038** - ECU, central electrical system **Version B = 60 ohms from 9../../1701** 2x 120 ohms parallel Terminating resistances: 120 ohms **A007** - Instrument panel 120 ohms **A013** - PCB, microfuses **Note:** *see §6*		
9	Not assigned	-	-	-	-
10	"Enter" button			0 VDC	5.0 VDC
		"Enter" button not depressed	1.8 VDC		
		"Enter" button depressed	0.6 VDC		
11	"ESC" button			0 VDC	5.0 VDC
		"ESC" button not depressed	1.8 VDC		
		"ESC" button depressed	0.6 VDC		
12	"Cursor up" button			0 VDC	5.0 VDC

Pin	description	condition	Signal Specified value	Wire interrupted	
				Signal from ECU	Signal from component
		"Cursor up" button not depressed	1.8 VDC		
		"Cursor up" button depressed	0.6 VDC		
13	"Cursor down" button			0 VDC	5.0 VDC
		"Cursor down" button not depressed	1.8 VDC		
		"Cursor down" button depressed	0.6 VDC		

NOTE: *The **A036** - Control panel, dashboard right/left is connected to the **A038** - ECU, central electrical system via the control bus (K-BUS).*
*The **A038** - ECU, central electrical system switches the functions preselected on the **A036** - Control panel, dashboard right/left*

see §6

6 A038 function; +supply; control bus

Relay mounting

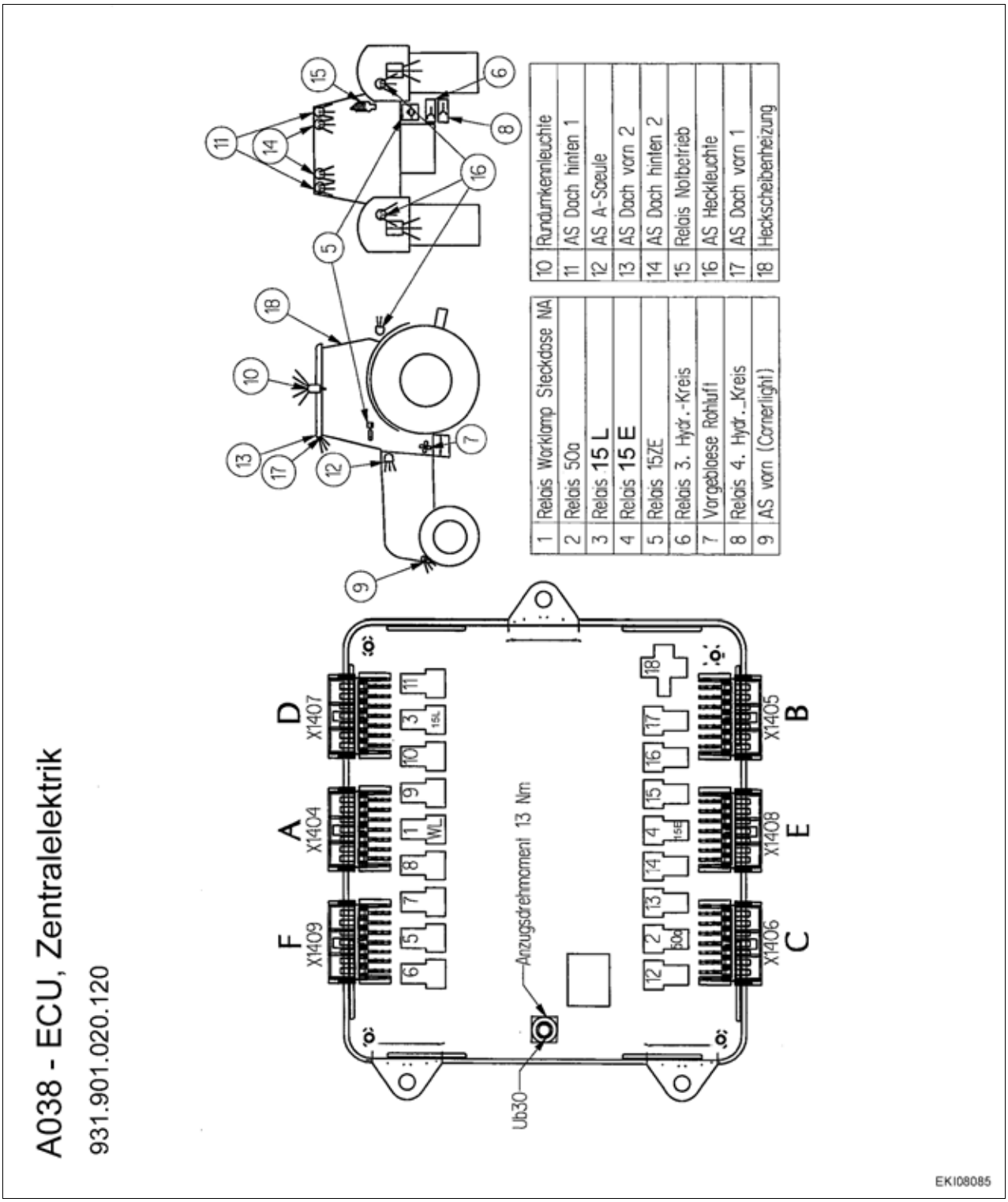


Fig. 32. I001997

Item	Designation	Item	Designation
1	Work light socket, NA	10	Rotating beacon **E021 - Rotating beacon, right** **E022 - Rotating beacon, left**
2	Relay 50a **A051 - ECU, engine control unit (EDC 7).**	11	Work light, rear roof 1 **E082 - Work light, rear right external (roof)** **E085 - Work light, rear left external (roof)**
3	Relay 15L **X1440 - Fuse holder + UB 15**	12	Work light, A pillar **E108 - Work light, right A pillar (optional Xenon)** **E109 - Work light, left A pillar (optional Xenon)**
4	Relay 15E **X1440 - Fuse holder + UB 15**	13	Work light, front roof 2 **E050 - Work lights, front left roof, internal** **E051 - Work lights, front right roof, internal**
5	Relay 15ZE **X1440 - Fuse holder + UB 15**	14	Work light, rear roof 2 **E083 - Work light, rear right internal (roof)** **E084 - Work light, rear left internal (roof)**
6	Hydraulic circuit relay 3 **X015 - External control socket Terminal 54**	15	Relay, emergency operation **A050 - ECU, basic control unit** **S012 - Switch, starter lockout** **S013 - Emergency mode button** **A050 - ECU, basic control unit** **Y004 - Solenoid valve, turbo-clutch**
7	Primary fan, intake air **M017 - Primary fan**	16	Work light, rear lamp **E078 - Work light, rear right mudguard (optional Xenon)** **E079 - Work light, rear left mudguard (optional Xenon)**
8	Hydraulic circuit relay 4 **X015 - External control socket Terminal 58L**	17	Work light, front roof 1 **E070 - Work lights, front right roof, external** **E071 - Work lights, front left roof, external**
9	Work light (corner light) **E074 - Work light, right (cornerlight)** **E075 - Work light, left (cornerlight)**	18	Rear window heater **E023 - Rear window heater**

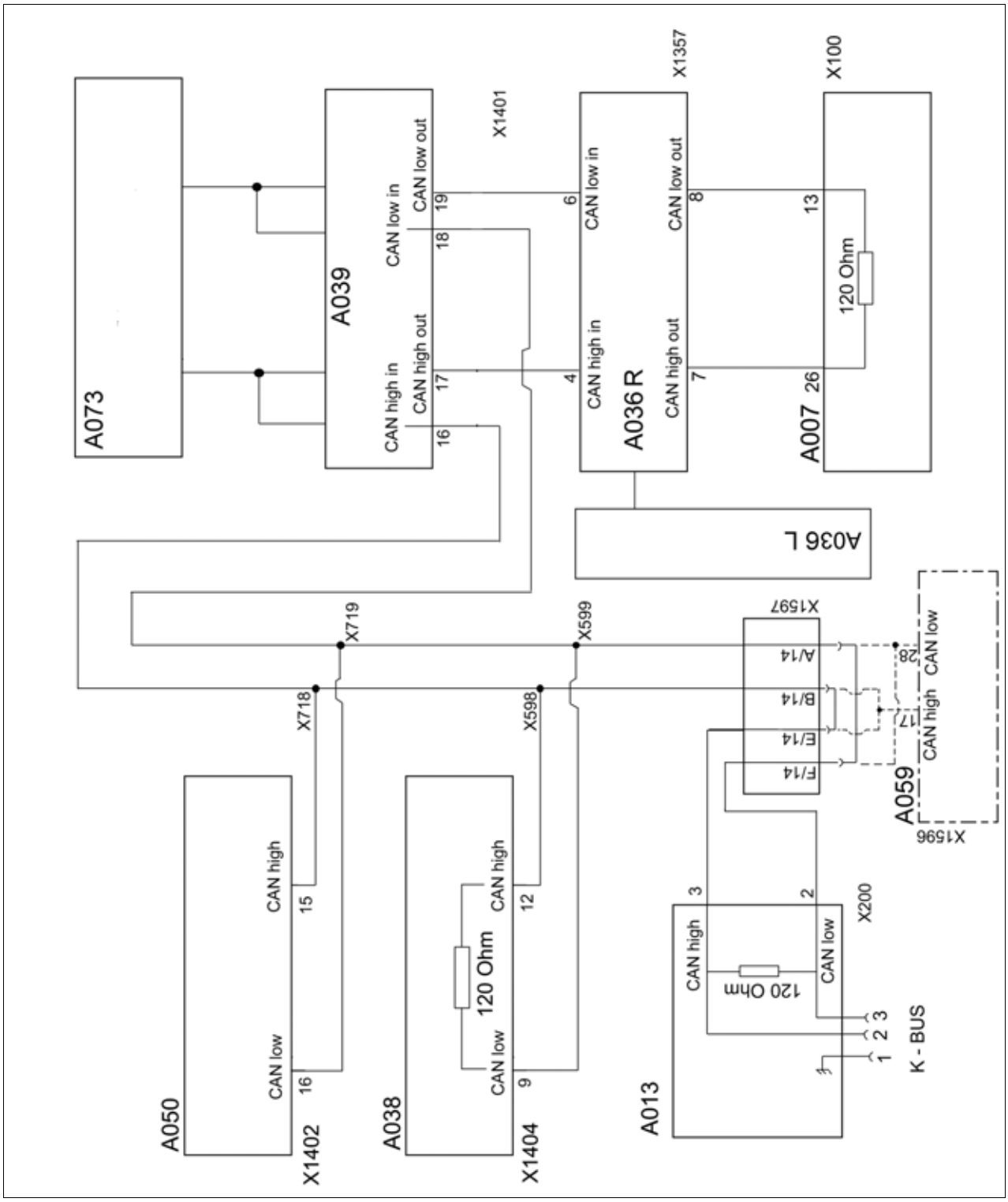


Fig. 33. Control bus, version A (to 9../../1700)

I007392

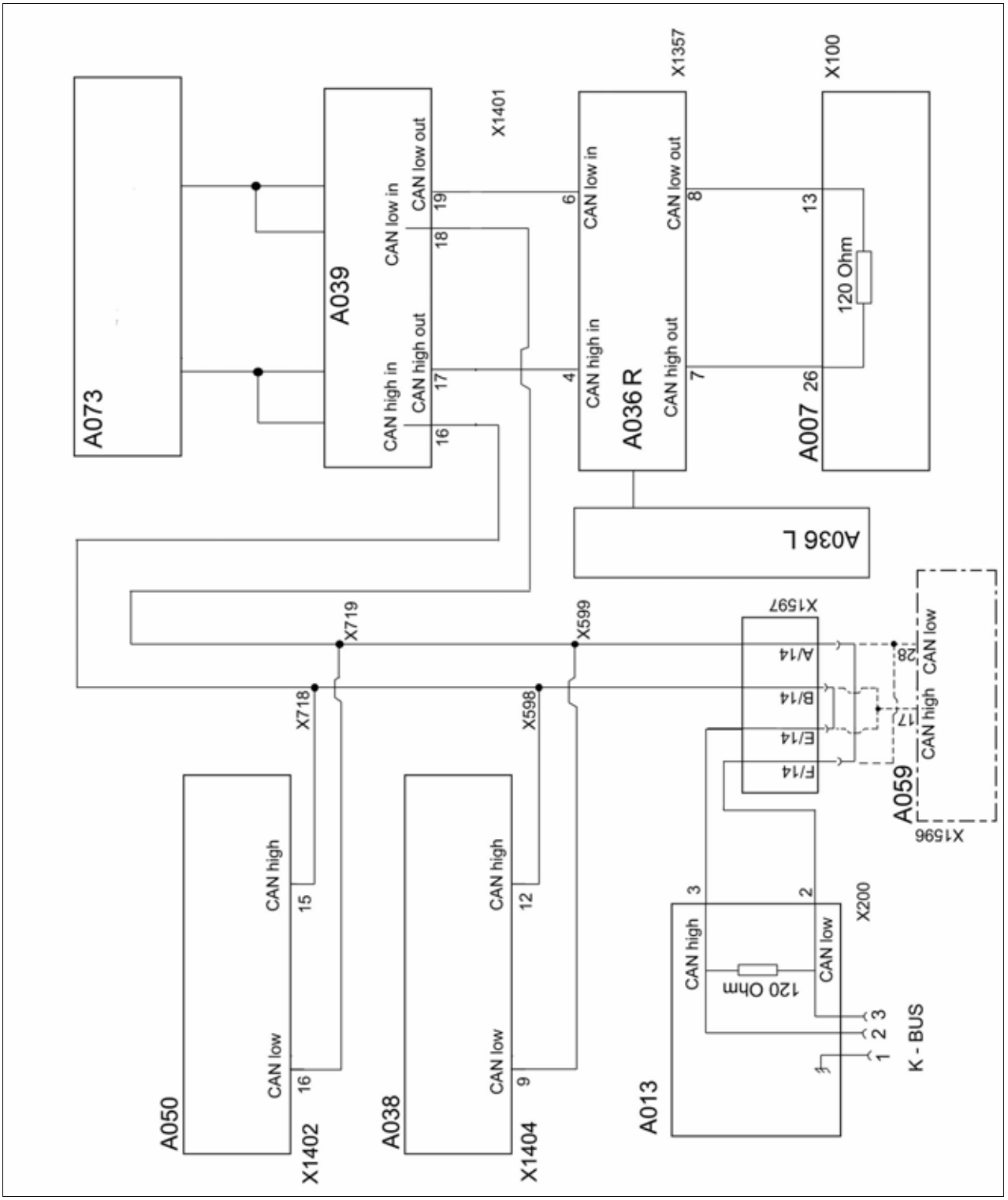


Fig. 34. Control bus, version B (from 9../../1701) I007393

A007 - Instrument panel	**A039** - MFA, multifunction armrest
A013 - PCB, microfuses	**A050** - ECU, basic control unit
A036 - Control panel, dashboard right/left	**A059** - Terminal (Auto-Guide)
A038 - ECU, central electrical system	**A073** - Terminal (A4)

Signal path to A038 - ECU, central electrical system

A function is switched on by the **A036** - Control panel, dashboard right/left (e.g. switch on work light)
The switch-on command runs via the control bus (K bus) to the**A038** - ECU, central electrical system.
The **A038** - ECU, central electrical system switches on the work light via a relay.

Measuring the supply voltage for the **A038** - ECU, central electrical system

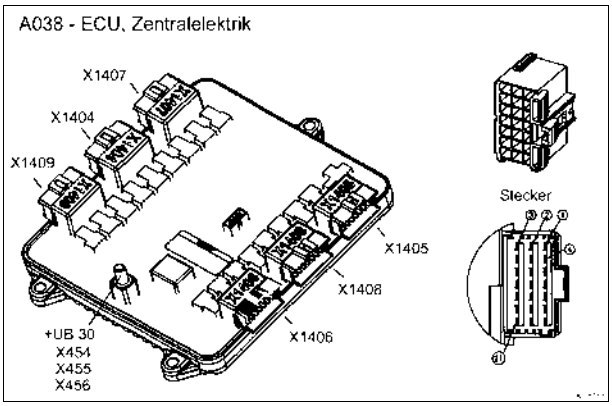


Fig. 35. I000727

X separation point =	Separation point: electrical diagram	X separation point =	Separation point: electrical diagram
X1404	A	X1407	D
X1405	B	X1408	E
X1406	C	X1409	F

NOTE: *Connect the X899.980.304.000 adapter box and the X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins (see table).see §16*

Prerequisite for this measurement:

– Use the **vehicle earth** to **earth**

Fit outputs on the **A038** - ECU, central electrical system with a 55 W bulb.
Voltage drop max. 1 VDC from last reading

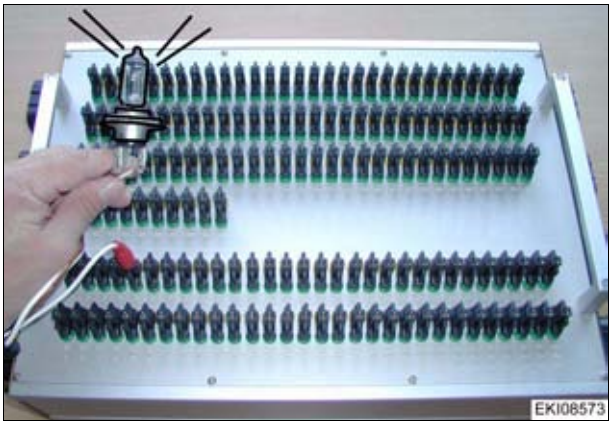


Fig. 36. I002375

Measuring the supply voltage (+UB 30) on the X454 separation point

+ UB 30 (battery voltage)				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
+ supply	+UB30	12.0 VDC	Ignition OFF	G001 battery, K058 relay, battery separation or in wiring set
		14.0 VDC	Engine is running	
Vehicle earth				

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
+ supply (+ UB 15)					
A15 (X1404)	+ supply (+ UB 15)	+ UB 15 Fuse F36 (X1440)			
		Ignition OFF	0 VDC	0 VDC	0 VDC
		Ignition ON.	12 VDC	0 VDC	12 VDC
X1440 fuse holder (+UB 15L "relay no. 3")					
D16 (X1407)	Actuation signal from S002 ignition switch to A038 central electrical system. Relay no. 3: +UB15L (relay coil)				
		Ignition OFF	0 VDC	0 VDC	0 VDC
		Ignition ON.	12 VDC	0 VDC	12 VDC
D7 (X1407)	+supply to relay no. 3: +UB15L (Relay input)				
	+ UB 30 X694 connector, battery +	Ignition OFF	12 VDC	0 VDC	12 VDC
D13 (X1407)	Activation signal from A038, central electrical system, to X1440 fuse holder (+ UB 15L) (Relay closer)				
		Ignition OFF	0 VDC	0 VDC	0 VDC
		Ignition ON.	12 VDC	12 VDC	0 VDC
X1440 fuse holder (+UB 15 E), "relay no. 4"					
E10 (X1408)	Actuation signal from S002 ignition switch to A038 central electrical system. Relay no. 4: +UB15E (Relay coil)				
		Ignition OFF	0 VDC	0 VDC	0 VDC
		Ignition ON.	12 VDC	0 VDC	12 VDC
E7 (X1408)	+supply to relay no. 4: +UB15E (Relay input)				
	+UB30 X694 connector, battery +	Ignition OFF	12 VDC	0 VDC	12 VDC
E13 (X1408)	Activation signal from A038, central electrical system, to X1440 fuse holder (+ UB 15E) (Relay closer)				
		Ignition OFF	0 VDC	0 VDC	0 VDC
		Ignition ON.	12 VDC	12 VDC	0 VDC
X1440 fuse holder (+ UB 15 ZSE) "relay no. 5"					

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
F7 (X1409)	+supply to relay no. 5: +UB15ZSE (Relay input)				
	+ UB 30 X694 connector, battery +	Ignition OFF	12 VDC	0 VDC	12 VDC
		Ignition ON.	12 VDC	1.71 VDC Not allocated	12 VDC
F13 (X1409)	Activation signal from A038, central electrical system, to X1440 fuse holder (+ UB 15ZSE) (Relay closer)				
		Ignition OFF	0 VDC	0 VDC	0 VDC
		Ignition ON.	12 VDC	12 VDC	1.71 VDC Not allocated

Control bus (K bus) "Version A" (to 9../../1700)

Pin	Pin description	Signal type/condition	Signal
A9 (X1404)	CAN low	Ignition OFF	**approx. 40 ohms (3x 120 ohms parallel)** Terminating resistances: **A007** - Instrument panel (120 ohms) **A013** - PCB, microfuses (120 ohms) **A038** - ECU, central electrical system (120 ohms)
A12 (X1404)	CAN high		

Control bus (K bus) "Version B" (from 9../../1701)

Pin	Pin description	Signal type/condition	Signal
A9 (X1404)	CAN low	Ignition OFF	**approx. 60 ohms (2 x 120 ohms connected in parallel)** Terminating resistances: **A007** - Instrument panel (120 ohms) **A013** - PCB, microfuses (120 ohms)
A12 (X1404)	CAN high		

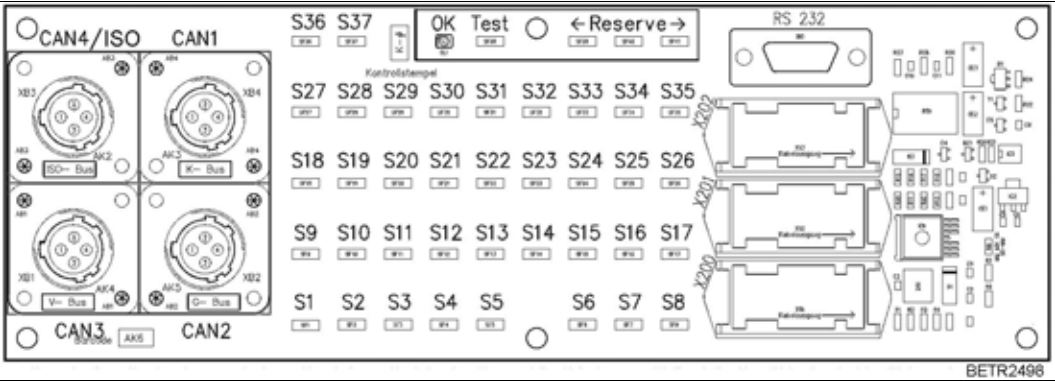


Fig. 37.

I002329

NOTE: *Measure resistance from control bus (K bus) directly to the **A013** - PCB, microfuses*

Control bus (K bus)
Ignition OFF
Using multimeter (ohmmeter),
measure pin 2 (CAN high) and
pin 3 (CAN low).
Measure

Resistance "Version A" = 40 ohms
Resistance "Version B" = 60 ohms

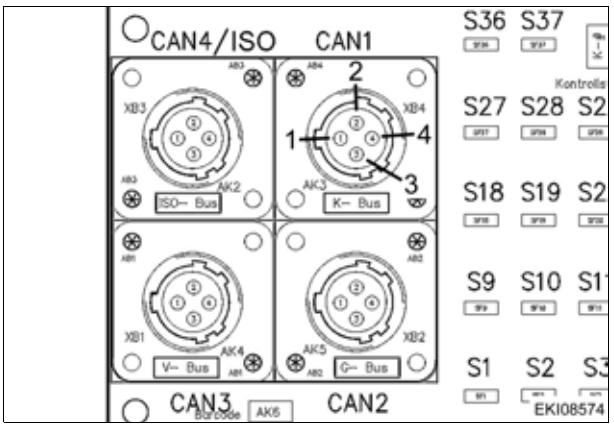


Fig. 38. I002376

7 A038 driving light, position light, direction indicator

Circuit diagram: driving light, position light, direction indicator

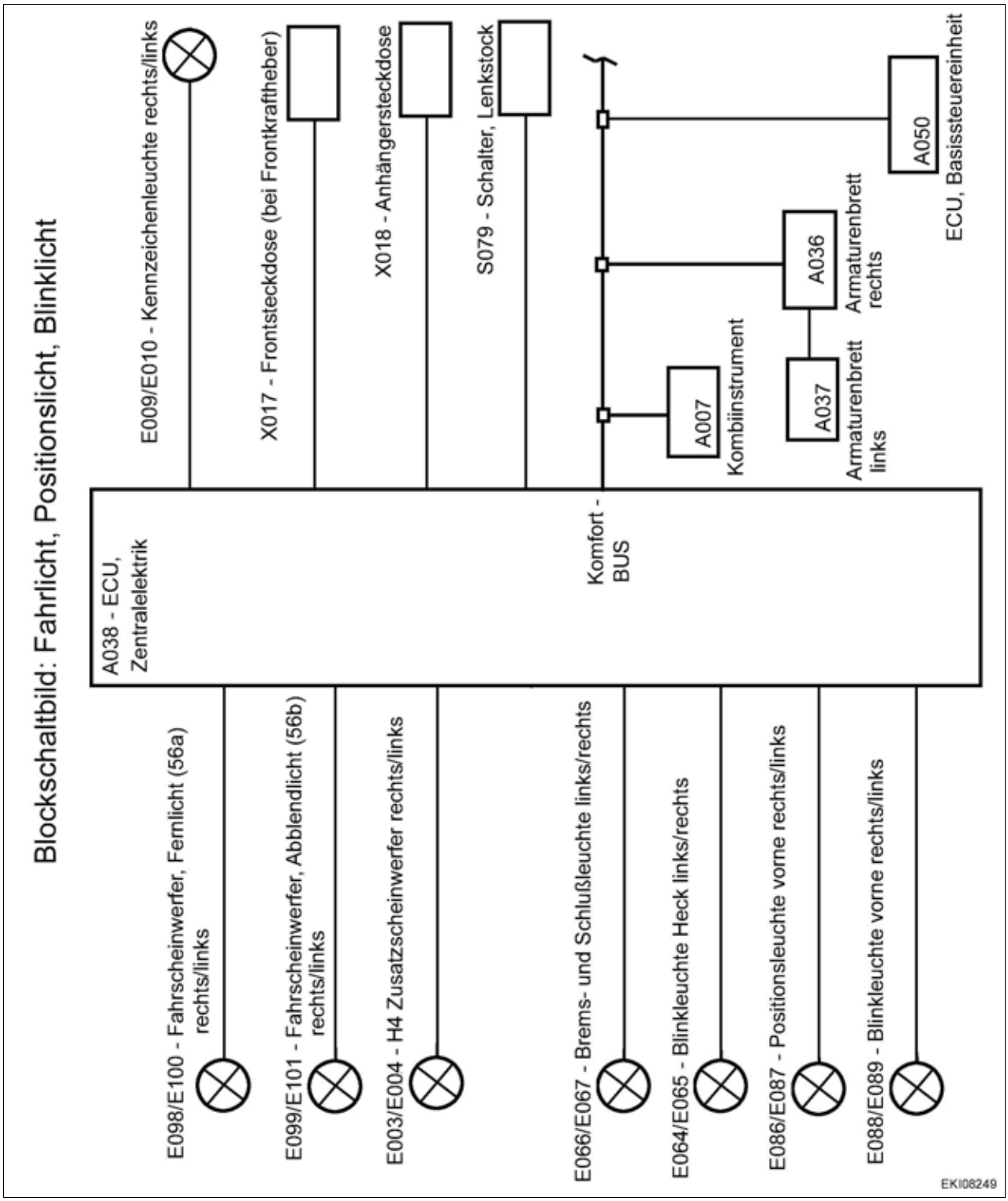


Fig. 39. I002010

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see §16*

Prerequisite for this measurement:

– Switch on ignition.
– Use the **vehicle earth** to **earth**

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
Activation of: **E003** - H4 additional headlight, right, **E004** - H4 additional headlight, left					
A11 (X1404)	**Signal**	Main beam (56a) OFF	0.22 VDC	14 VDC not loadable	0 VDC
		Main beam (56a) ON	14 VDC	14 VDC	0 VDC
A20 (X1404)	**Signal**	Dipped beam (56b) OFF	0 VDC	14 VDC not loadable	0 VDC
		Dipped beam (56b) ON	14 VDC	14 VDC	0 VDC
Activation of: **A015** - Radio; **E009** - Licence plate lighting, right; **E010** - Licence plate lighting, left; **E086** - Side lamp, front right; **E087** - Side lamp, front left					
B8 (X1405)	**Signal**				
		Parking light OFF	0 VDC	4.4 VDC not loadable	0 VDC
		Parking light ON	12 VDC	12 VDC	0 VDC
Activation of: **E064** - Rear direction indicator, left					
D17 (X1407)	**Signal**	Left direction indicator OFF	0 VDC	8 VDC not loadable	0 VDC
		Left direction indicator ON	12 VDC intermit-tent	12 VDC intermittent	0 VDC
Activation of: **E065** - Rear direction indicator, right					
D20 (X1407)	**Signal**	Right direction indicator OFF	0 VDC	8 VDC not loadable	0 VDC
		Right direction indicator ON	12 VDC intermit-tent	12 VDC intermittent	0 VDC
Activation of: **E066** - Brake and tail light left					
A6 (X1404)	**Signal "Left brake light (54)"**	Foot brake not applied	0 VDC	8 VDC not loadable	0 VDC
		Foot brake applied	12 VDC	12 VDC	0 VDC
B11 (X1405)	**Signal "Left tail light (58)"**	Parking light OFF	0 VDC	8 VDC not loadable	0 VDC
		Parking light ON	12 VDC	12 VDC	0 VDC

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
Activation of: **E067** - Brake and tail light right					
A5 (to X1404)	**Signal "Right brake light (54)"**	Foot brake not applied	0 VDC	8 VDC not loadable	0 VDC
		Foot brake applied	12 VDC	12 VDC	0 VDC
B13 (X1405)	**Signal "Right tail light (58)"**	Parking light OFF	0 VDC	8 VDC not loadable	0 VDC
		Parking light ON	12 VDC	12 VDC	0 VDC
Activation of: **E088** - Direction direction indicator, front right					
C2 (X1406)	**Signal "Right direction indicator (R)"**	Right direction indicator OFF	0 VDC	8 VDC not loadable	0 VDC
		Right direction indicator ON	12 VDC intermittent	12 VDC intermittent	0 VDC
Activation of: **E089** - Direction direction indicator, front left					
C5 (X1406)	**Signal "Left direction indicator (L)"**	Left direction indicator OFF	0 VDC	8 VDC not loadable	0 VDC
		Left direction indicator ON	12 VDC intermittent	12 VDC intermittent	0 VDC
Activation of: **E098** - Drive headlight (main beam), right; **E100** - Drive headlight (main beam), left					
A17 (X1404)	**Signal "Main beam (56a)"** Engine is running				
		Main beam OFF	0 VDC	13 VDC not loadable	0 VDC
		Main beam ON	14 VDC	14 VDC	0 VDC
Activation of: **E099** - Drive headlight (dipped beam), right; **E101** - Drive headlight (dipped beam), left					
A10 (X1404)	**Signal "Dipped beam (56b)"** Engine is running				
		Dipped beam OFF	0 VDC	13 VDC not loadable	0 VDC
		Dipped beam ON	14 VDC	14 VDC	0 VDC
Detection from: **S079** - Switch, steering column					
B6 (X1405)	**Dipped beam (56b) / main beam (56a)** Engine is running	Dipped beam (56b) ON	14 VDC	1.7 VDC not loadable	14 VDC

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
		Main beam (56a) ON	1.7 VDC not loadable	1.7 VDC not loadable	14 VDC
D10 (X1407)	**Front washer system**	M003 front wiper pump OFF	1.7 VDC not loadable	1.7 VDC not loadable	0 VDC
		M003 front wiper pump ON	12 VDC	1.7 VDC not loadable	12 VDC
D14 (X1407)	**Front wiper motor**	M002 front wiper motor OFF	1.7 VDC not loadable	1.7 VDC not loadable	0 VDC
		M002 front wiper motor ON	12 VDC	1.7 VDC not loadable	12 VDC
D15 (X1407)	**Front wiper motor "intermittent"**	M002 front wiper motor "intermittent", OFF	1.7 VDC not loadable	1.7 VDC not loadable	0 VDC
		M002 front wiper motor "intermittent", ON	12 VDC constant	1.7 VDC not loadable	12 VDC constant
E9 (X1408)	**Left direction indicator (L)**	Left direction indicator (L) OFF	1.7 VDC not loadable	1.7 VDC not loadable	0 VDC
		Left direction indicator (L) ON	12 VDC constant	1.7 VDC not loadable	12 VDC constant
E11 (X1408)	**Right direction indicator (R)**	Right direction indicator (R) OFF	1.7 VDC not loadable	1.7 VDC not loadable	0 VDC
		Right direction indicator (R) ON	12 VDC constant	1.7 VDC not loadable	12 VDC constant
E14 (X1408)	**Main light flash**	Main light flash OFF	1.7 VDC not loadable	1.7 VDC not loadable	0 VDC
		Main light flash ON	12 VDC	1.7 VDC not loadable	12 VDC
Activation of: **X017** - Front socket; **X018** - Rear socket					
B5 (X1405)	**Signal "Left direction indicator (L)"**	Left direction indicator (L) OFF	0 VDC	0 VDC	0 VDC
		Left direction indicator (L) ON	12 VDC intermittent	12 VDC intermittent	0 VDC
B3 (X1405)	**Signal "Right direction indicator (R)"**	Right direction indicator (R) OFF	0 VDC	0 VDC	0 VDC
		Right direction indicator (R) ON	12 VDC intermittent	12 VDC intermittent	0 VDC
B7 (X1405)	**Signal "Left wide vehicle marker light/tail light (58L)"**	Left wide vehicle marker light/tail light (58L) OFF	4.4 VDC not loadable	4.4 VDC not loadable	0 VDC

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
		Left wide vehicle marker light/tail light (58L) ON	12 VDC	12 VDC	0 VDC
B4 (X1405)	**Signal "Right wide vehicle marker light/tail light (58R)"**	Right wide vehicle marker light/tail light (58R) OFF	4.4 VDC not load-able	4.4 VDC not loadable	0 VDC
		Right wide vehicle marker light/tail light (58R) ON	12 VDC	12 VDC	0 VDC
A8 (X1404)	**Signal "Brake light (54)"**	Brake light OFF	12 VDC not load-able	12 VDC not loadable	0 VDC
		Brake light ON	12 VDC	12 VDC	0 VDC

NOTE: *see §6*

8 A038 horn, rotating beacon, wide vehicle marker

Circuit diagram: horn, rotating beacon, wide vehicle marker light)

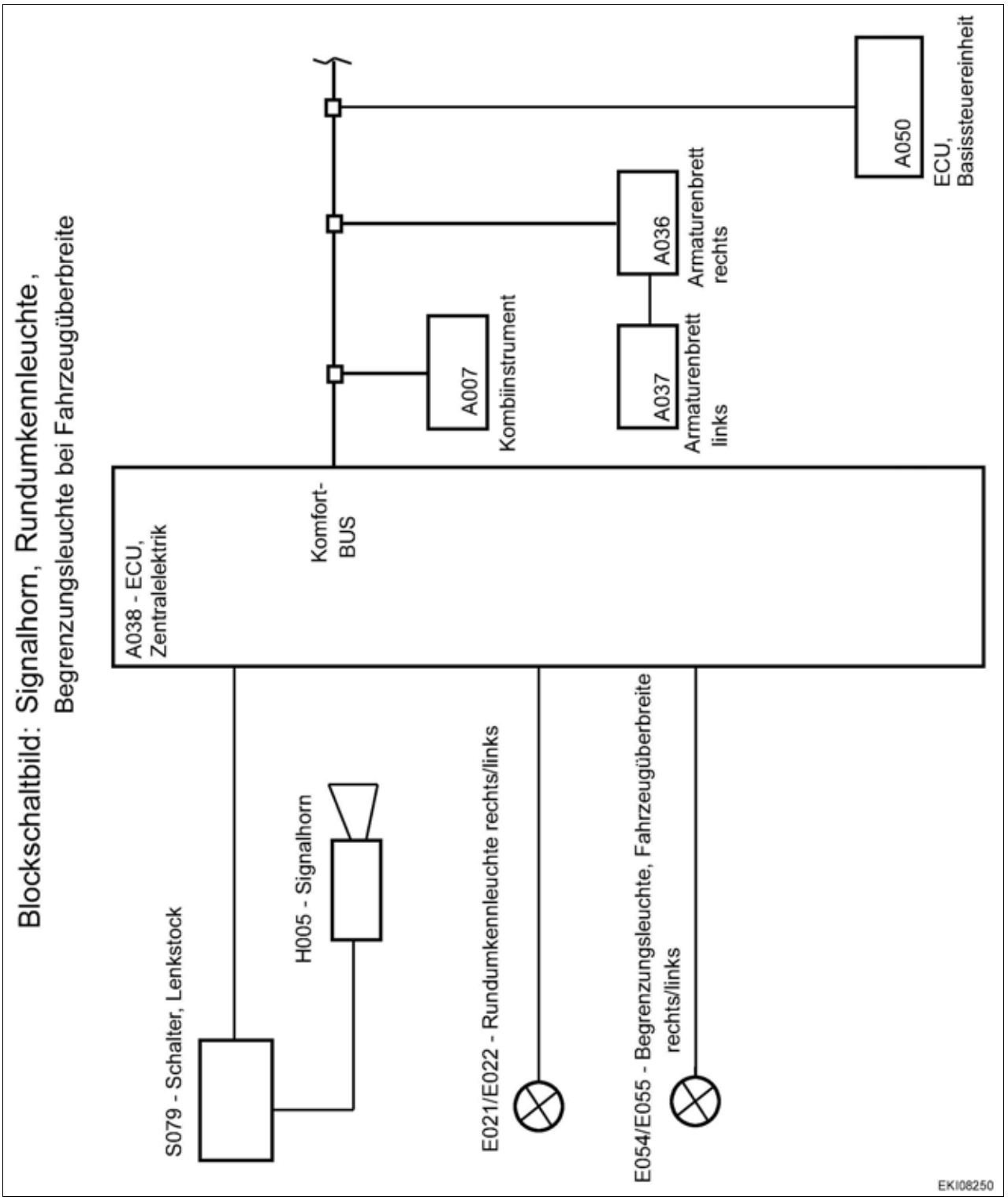


Fig. 40. I002011

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see § 16*

Prerequisite for this measurement:

– Switch on ignition.
– Use the **vehicle earth** to **earth**

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
Activation of:E021 - Rotating beacon, right; **E022** - Rotating beacon, left					
D21 (X1407)	**+supply to relay no. 10** + UB 30 Fuse F29 (X1440)	Ignition OFF	12 VDC	0 VDC	12 VDC
D19 (X1407)	**Signal**	Rotating beacon OFF	0 VDC	0 VDC	0 VDC
		Rotating beacon ON	12 VDC	12 VDC	0 VDC
Activation of:E054 - Wide vehicle marker lights, right					
B15 (X1405)	**Signal**	Wide vehicle marker light OFF	0 VDC	8 VDC not loadable	0 VDC
		Wide vehicle marker light ON	12 VDC	12 VDC	0 VDC
Activation of:E055 - Wide vehicle marker lights, left					
B14 (X1405)	**Signal**	Wide vehicle marker light OFF	0 VDC	8 VDC not loadable	0 VDC
		Wide vehicle marker light ON	12 VDC	12 VDC	0 VDC

NOTE: *see §6*

NOTE: *The H005 horn is energised directly by **S079** - Switch, steering column.*
see §110

9 A038 work light

Circuit diagram: work light

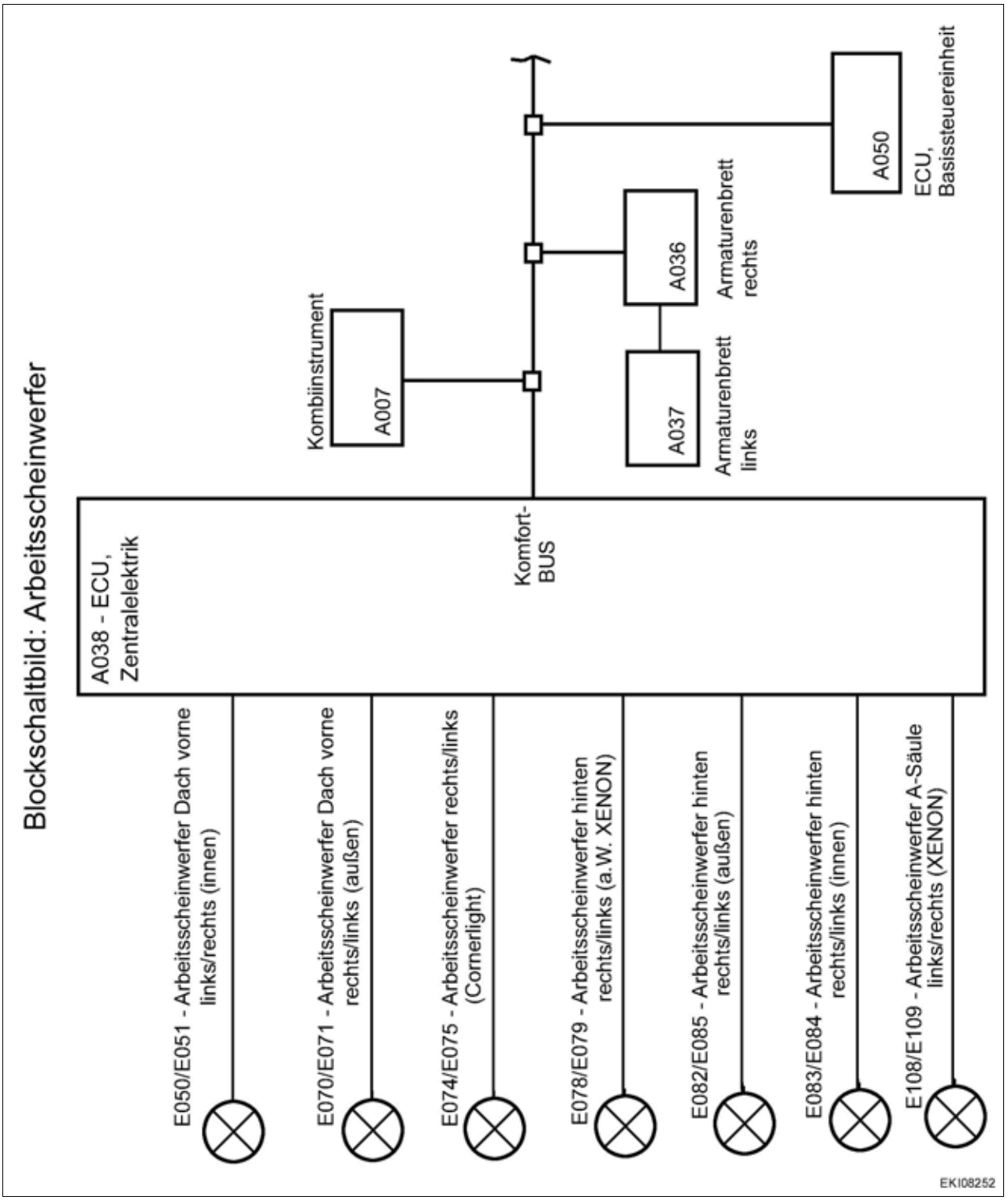


Fig. 41. I002012

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see § 16*

Prerequisite for this measurement:

– Switch on ignition.
– Use the **vehicle earth** to **earth**

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
Activation of:E050 - Work lights, front left roof, internal;**E051** - Work lights, front right roof, internal					
C21 (X1406)	**+supply to relay no. 13** + UB 30 Fuse F28 (X1440)	Ignition OFF	12 VDC	0 VDC	12 VDC
C19 (X1406)	**Signal**	Work light OFF	0 VDC	0 VDC	0 VDC
		Work lights ON	12 VDC	12 VDC	0 VDC
Activation of:E070 - Work lights, front right roof, external; **E071** - Work lights, front left roof, external					
B12 (X1405)	**+supply to relay no. 17** + UB 30	Ignition OFF	12 VDC	0 VDC	12 VDC
B10 (X1405)	**Signal** E070 - fuse F10 (X1440) E071 - fuse F11 (X1440)				
		Work light OFF	0 VDC	0 VDC	0 VDC
		Work lights ON	12 VDC	12 VDC	0 VDC
Activation of:E074 - Work light, right (cornerlight); **E075** - Work light, left (cornerlight)					
A3 (X1404)	**+supply to relay no. 9** + UB 30 Fuse F14 (X1440)	Ignition OFF	12 VDC	0 VDC	12 VDC
A1 (X1404)	**Signal**	Work light OFF	0 VDC	0 VDC	0 VDC
		Work lights ON	12 VDC	12 VDC	0 VDC
Activation of:E078 - Work light, rear right mudguard (optional Xenon); **E079** - Work light, rear left mudguard (optional Xenon)					
E20 (X1408)	**+supply to relay no. 16** + UB 30 X694 connector, battery +	Ignition OFF	12 VDC	0 VDC	12 VDC
E21 (X1408)	**Signal**	Work light OFF	0 VDC	0 VDC	0 VDC
		Work lights ON	12 VDC	12 VDC	0 VDC
Activation of:E082 - Work light, rear right external (roof); **E085** - Work light, rear left external (roof)					
D3 (X1407)	**+supply to relay no. 11** + UB 30 Fuse F15 (X1440)	Ignition OFF	12 VDC	0 VDC	12 VDC
D1 (X1407)	**Signal**	Work light OFF	0 VDC	0 VDC	0 VDC
		Work lights ON	12 VDC	12 VDC	0 VDC

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
Activation of:E083 - Work light, rear right internal (roof); **E084** - Work light, rear left internal (roof)					
E3 (X1408)	**+supply to relay no. 14** + UB 30 Fuse F16 (X1440)	Ignition OFF	12 VDC	0 VDC	12 VDC
E1 (X1408)	**Signal**	Work light OFF	0 VDC	0 VDC	0 VDC
		Work lights ON	12 VDC	12 VDC	0 VDC
Activation of:E108 - Work light, right A pillar (optional Xenon); **E109** - Work light, left A pillar (optional Xenon)					
C3 (X1406)	**+supply to relay no. 12** + UB 30 X697 connector, battery+	Ignition OFF	12 VDC	0 VDC	12 VDC
C1 (X1406)	**Signal**	Work light OFF	0 VDC	0 VDC	0 VDC
		Work lights ON	12 VDC	12 VDC	0 VDC

NOTE: *see §6*

10 A038 interior lighting

Circuit diagram: interior lighting

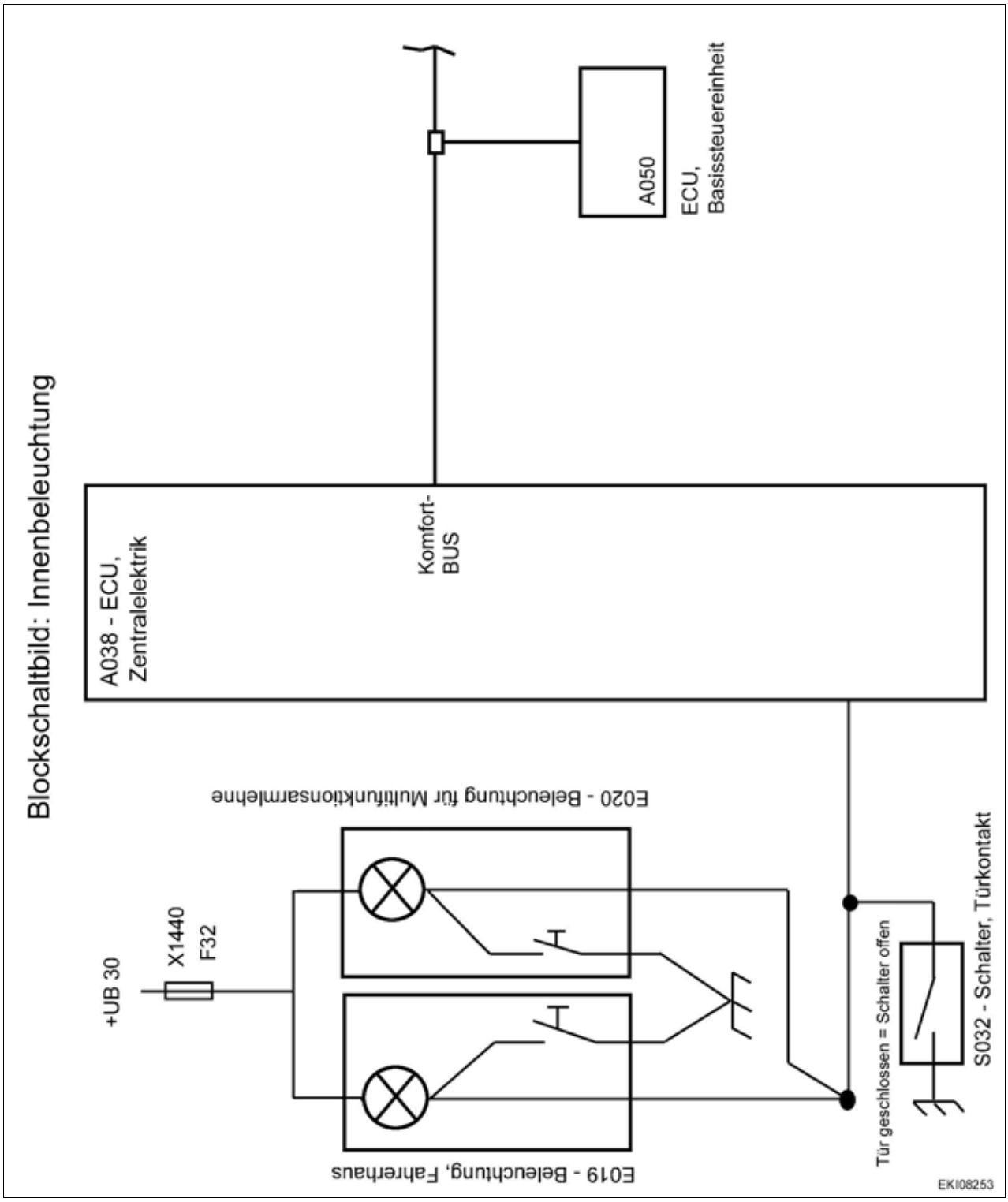


Fig. 42. I002013

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see §16*

Prerequisite for this measurement:

– Switch on ignition.
– Use the **vehicle earth** to **earth**

Pin	description	Signal type/condition	Signal	Break in wiring	
				Signal from ECU	Signal from compo-nent
E019 - Lighting, cab **E020** - Lighting (multifunction armrest)					
B18 (X1405)	Switched earth for: E019/E020 lighting	-	-	-	-
Note: The E019/E020 lighting is supplied by +UB 30 (fuse F32 in X1440) – **Open cab door** (the **S032** - Switch, left door contact switches on earth) –> lighting on - **Close cab door** (the **S032** - Switch, left door contact). The **A038** - ECU, central electrical system dims the switch-off procedure –> lighting is slowly extinguished – Earth is switched **by E019/E020 lighting switch** –> lighting is constantly on					
Test: - Cab door closed (**S032** - Switch, left door contact open) Using multimeter (voltmeter), Measure **contact B16 (X1405) "+UB 30"** and **contact B18 (X1405) "Earth"**					
		Lighting OFF	0 VDC	-	-
		Lighting ON	12 VDC	-	-

NOTE: *see §6*

11 A038 wipers, rear window heater, mirror heater

Circuit diagram: wipers, rear window heater, mirror heater

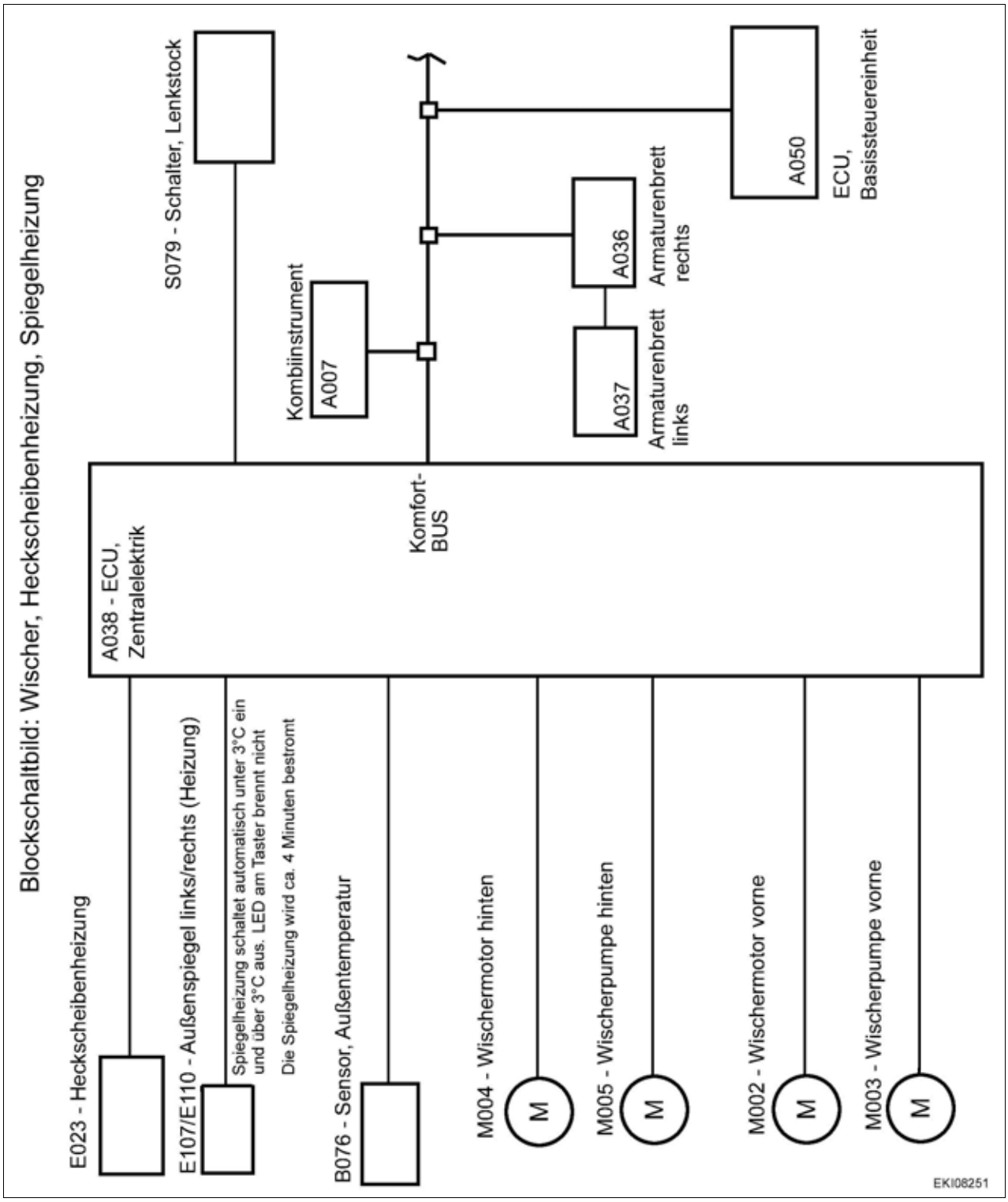


Fig. 43. I002014

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see §16*

Prerequisite for this measurement:

– Switch on ignition.
– Use the **vehicle earth** to **earth**

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
B076 - Sensor, external temperature (on front of air conditioning condenser)					
C17 (X1406)	**Signal**				
	-20°C	120 Kohms	4.6 VDC	4.8 VDC	0 VDC
	- 10°C	60 Kohms	4.3 VDC		
	0°C	32 Kohms	4.0 VDC		
	10°C	20 Kohms	3.6 VDC		
	20°C	13 Kohms	3.1 VDC		
	30°C	8 Kohms	2.6 VDC		
	40°C	5 Kohms	2.0 VDC		
	50°C	3.5 Kohms	1.6 VDC		
Activation of:E023 - Rear window heater					
B16 & B17 (X1405)	**+supply to relay no. 18** + UB 30 Fuse F17 (X1440)	Ignition OFF	12 VDC	0 VDC	12 VDC
19 and 20 (on X1405)	**Signal**	Rear window heater OFF	0 VDC	0 VDC	0 VDC
		Rear window heater ON	12 VDC	12 VDC	0 VDC
Activation of:E106 - Exterior mirror (adjustment/heater), right; **E107** - Exterior mirror (adjustment/heater), left **Note:** The mirror heater switches on automatically below 3°C. The mirror heater is powered for approx. 4 minutes.					
E6 (X1408)	**Signal**	Mirror heater OFF	0 VDC	0 VDC	0 VDC
		Mirror heater ON	12 VDC	12 VDC	0 VDC
Supply to: **M002** - Front wiper motor					
D5 (X1407)	**+supply (53) to:** **M002** - Front wiper motor	Wiper motor OFF	0 VDC	12 VDC not loadable	0 VDC
		Wiper motor ON	12 VDC	12 VDC	0 VDC
		Using multimeter (ampere meter), open and measure pin 5.	Approx. 5 ADC	-	-
D9 (X1407)	**Control line (31b)** from **M002** - Front wiper motor to **A038** - ECU, central electri-cal system				

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
		Wiper motor OFF	0 VDC	approx. 4 VDC	0 VDC
		Wiper motor ON	approx. 4 VDC		
If the control line (31b) is interrupted: The **A038** - ECU, central electrical system does not detect the part position and the **M002** - Front wiper motor does not switch off. **NOTE:** *see §91*					
Activation ofM003 - Wiper pump, front					
E15 (X1408)	**Signal**	Wiper pump OFF	0 VDC	8.0 VDC not loadable	0 VDC
		Wiper pump ON	12 VDC	12 VDC	0 VDC
Supply to: **M004** - Rear wiper motor					
D8 (X1407)	**+supply (53) to:** **M004** - Rear wiper motor	Wiper motor OFF	0 VDC	12 VDC not loadable	0 VDC
		Wiper motor ON	12 VDC	12 VDC	0 VDC
		Using multimeter (ampere meter), open and measure pin 8.	Approx. 5 ADC	-	-
D11 (X1407)	**Control line (31b)** from **M004** - Rear wiper motor to **A038** - ECU, central electrical system				
	Ignition ON.	Wiper motor OFF	0 VDC	approx. 4 VDC	0 VDC
		Wiper motor ON	approx. 4 VDC		
If the control line (31b) is interrupted: The A038 ECU, central electrical system does not recognise the park position and the M004 wiper motor does not switch off. **NOTE:** *see §93*					
Activation of:M005 - Wiper pump, rear					
E12 (X1408)	**Signal**	Wiper pump OFF	0 VDC	8.0 VDC not loadable	0 VDC
		Wiper pump ON	12 VDC	12 VDC	0 VDC
Detection of:S079 - Switch, steering column					
D10 (X1407)	**Front washer system**	M003 front wiper pump OFF	1.7 VDC not load-able	1.7 VDC not loadable	0 VDC
		M003 front wiper pump ON	12 VDC	1.7 VDC not loadable	12 VDC
D14 (X1407)	**Front wiper motor**	M002 front wiper motor OFF	1.7 VDC not load-able	1.7 VDC not loadable	0 VDC

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
		M002 front wiper motor ON	12 VDC	1.7 VDC not loadable	12 VDC
D15 (X1407)	**Front wiper motor "intermittent"**	M002 front wiper motor "intermittent", OFF	1.7 VDC not loadable	1.7 VDC not loadable	0 VDC
		M002 front wiper motor "intermittent", ON	12 VDC constant	1.7 VDC not loadable	12 VDC

NOTE: *see §6*

12 A038 automatic air conditioning system

Circuit diagram: automatic air conditioning system (heater, ventilation, air conditioning unit)

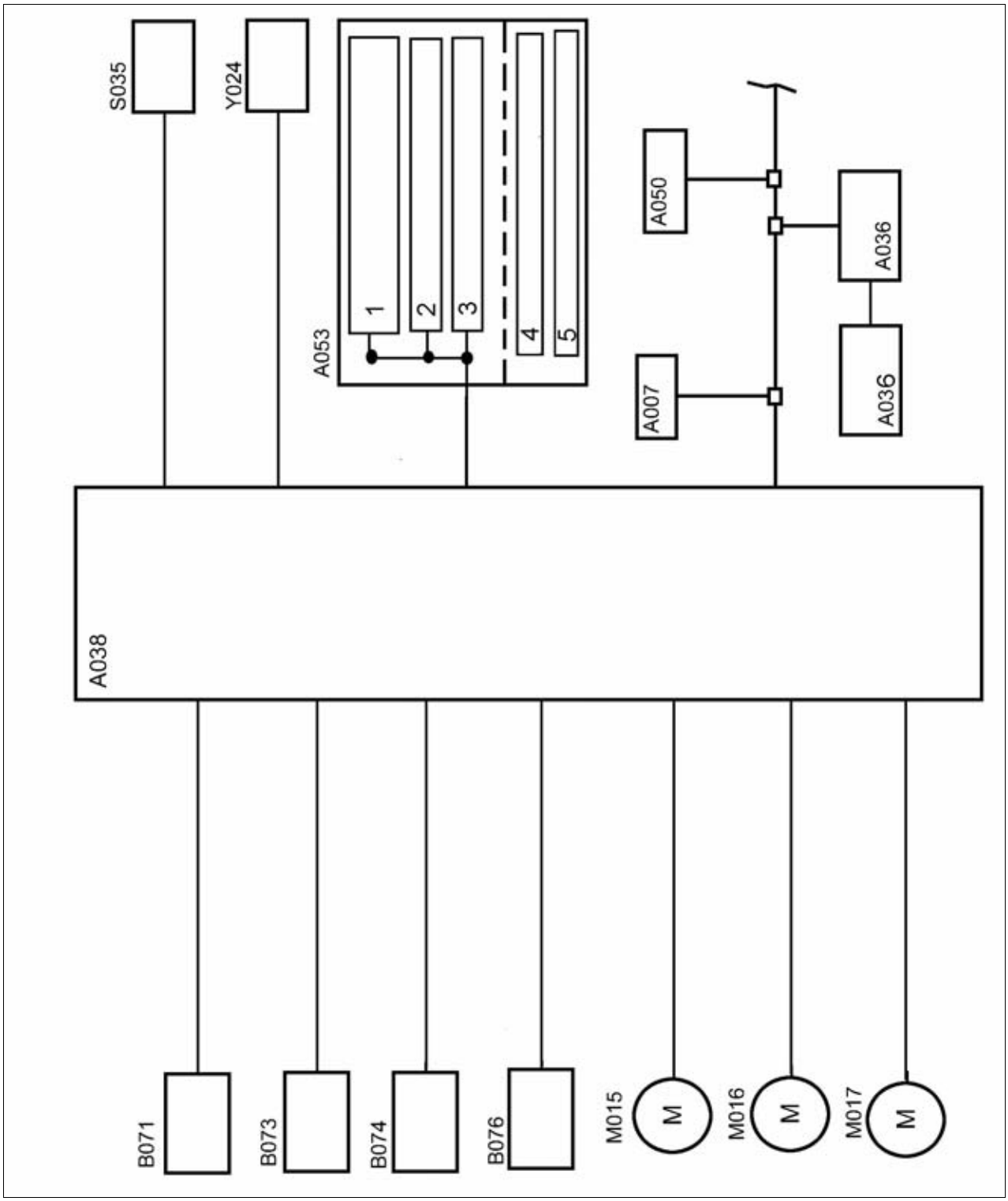


Fig. 44. I007395

Item	Designation	Item	Designation
A007 - Instrument panel		**M015** - Actuator motor, top/middle air flap	
A036 - Control panel, dashboard right/left		**M016** - Servomotor, bottom air valve	
A038 - ECU, central electrical system		**M017** - Primary fan	

Item	Designation	Item	Designation
A050 - ECU, basic control unit		**S035** - Switch, high-pressure/low-pressure (air conditioning system)	
A051 - ECU, engine control unit (EDC 7).		**Y024** - Magnetic clutch, air conditioning compressor	
A053 - ECU, air conditioning control		1	Temperature on evaporator (protection against icing up)
B071 - Sensor, output temperature		2	Heater valve (stepper motor)
B073 - Sensor, solar (irradiation)		3	Stepless fan
B074 - Sensor, internal temperature		4	Evaporator (air conditioning system) "Cold air"
B076 - Sensor, external temperature		5	Heat exchanger (heater) "Warm air"

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see §16*

Prerequisite for this measurement:

– Switch on ignition.
– Use the **vehicle earth** to **earth**

Pin	Pin description	Signal type/condition	Signal	Wire interrupted	
				Signal from A038 ECU	Signal from component
A053 - ECU, air conditioning control					
C8 (X1406)	**Sensor, evaporator temperature** **Note:** Read sensor temperature from FENDIAS diagnosis.				
	- 20 °C	approx. 64 Kohms	3.0 VDC	4.2 VDC not loadable	0 VDC
	- 10 °C	approx. 28 Kohms	2.2 VDC		
	0 °C	approx. 16 Kohms	1.6 VDC		
	10 °C	approx. 9.0 Kohms	1.1 VDC		
	20 °C	Approx 7.0 Kohms	0.82 VDC		
	30 °C	approx. 4.6 Kohms	0.66 VDC		
	40 °C	approx. 3.3 Kohms	0.50 VDC		
	50 °C	approx. 2.3 Kohms	0.36 VDC		
F8 (X1409)	**Speed controller for the fan (continuously variable)**	Fan OFF	approx. 0.12 VDC	approx. 0.12 VDC	0 VDC
		Fan ON	0.12 to 12 VDC	0.12 to 12 VDC	0 VDC
B9 (X1405)	**Diagnostics for fan (continuously variable)**	Fan OK	3.2 VDC not loadable	3.2 VDC not loadable	0.5 to 1.8 to 0.6 VDC (low .... high rotating speed)

Pin	Pin description	Signal type/condition	Signal	Wire interrupted	
				Signal from A038 ECU	Signal from compo-nent
		Fan faulty	0 VDC		
C14 (X1406)	**+supply, heater valve "Stepper" motor**				
		Ignition OFF	0 VDC	0 VDC	0 VDC
		Ignition ON.	12 VDC	Briefly 12 VDC then 0 VDC	0 VDC
F3 (X1409)	**Earth, heater valve "Stepper" motor**		-	-	-
F6 (X1409)					
F10 X1409)					
F12 (X1409)					
B071 - Sensor, output temperature					
C11 (X1406)	**Signal** **Note:** Read sensor temperature from FENDIAS diagnosis.				
	-20°C	approx. 105 Kohms	4.5 VDC	4.9 VDC not loadable	0 VDC
	- 10°C	approx. 56 Kohms	4.3 VDC		
	0°C	approx. 31 Kohms	3.9 VDC		
	10°C	approx. 19 Kohms	3.5 VDC		
	15°C	approx. 14 Kohms	3.2 VDC		
	20°C	approx. 12 Kohms	3.0 VDC		
	30°C	approx. 8.0 Kohms	2.5 VDC		
	40°C	approx. 5.1 Kohms	2.0 VDC		
	50°C	approx. 3.4 Kohms	1.6 VDC		
B073 - Sensor, solar (irradiation) **Note:** The B073 sensor regulates the air conditioning characteristic according to the level of sunlight entering the cab. If the B073 sensor fails, the A038 ECU, central electrical system regulates the automatic air conditioning system with the help of a preset characteristic (replacement value). Replacement value = 7 W/mm2					
A18 (X1404)	**+ supply**	Ignition OFF	0 VDC	0 VDC	0.4 VDC
		Ignition ON.	5.0 VDC	5.0 VDC	0.28 VDC

Pin	Pin description	Signal type/condition	Signal	Wire interrupted	
				Signal from A038 ECU	Signal from compo-nent
C9 (X1406) C20 (X1406)	**Signal** **Solar sensor 1** **Signal** **Solar sensor 2** **Note:** The signal from the solar sen-sor is dependent on: – Brightness – Heat insolation	The following values apply to both solar sensors:			
		Sensor in: – Darkened surroundings – Approx. 20°C	approx. 80 mVDC	0 VDC	0 VDC
		Sensor in: – Bright surroundings – Approx. 20°C	approx. 90 mVDC	0 VDC	approx. 2 VDC
B074 - Sensor, internal temperature					
F5 (X1409)	**+ supply**	Ignition OFF, Fan OFF	0 VDC	0 VDC	0 VDC
		Ignition ON, Fan ON	approx. 12 VDC	2.4 VDC	0 VDC
C10 (X1406)	**Signal**				
	0°C	Approx 7.0 Kohms			
	10 °C	Approx 4.5 Kohms			
	20 °C	Approx 3.0 Kohms			
	25 °C	Approx 2.2 Kohms			
	30 °C	Approx 1.8 Kohms			
	40 °C	Approx 1.5 Kohms			
	50 °C	Approx 1.0 Kohms			
	60 °C	Approx 0.8 Kohms			
B076 - Sensor, external temperature **(on front of air conditioning condenser)**					
C17 (X1406)	**Signal**				
	-20°C	120 Kohms	4.6 VDC	4.8 VDC	0 VDC
	- 10°C	60 Kohms	4.3 VDC		
	0°C	32 Kohms	4.0 VDC		
	10°C	20 Kohms	3.6 VDC		
	20°C	13 Kohms	3.1 VDC		
	30°C	8.0 Kohms	2.6 VDC		
	40°C	5.0 Kohms	2.0 VDC		
	50°C	3.5 Kohms	1.6 VDC		
Activation of:M015 - Actuator motor, top/middle air flap **(Resistance = approx. 47.2 ohms)**					

Pin	Pin description	Signal type/condition	Signal	Wire interrupted	
				Signal from A038 ECU	Signal from compo-nent
F17 (X1409)	**"Open"**	Vent flap not operated	0 VDC	0 VDC	0 VDC
		Vent flap opens (LED ON)	12 VDC	12 VDC	0 VDC
		Using multimeter (ampere meter), open and measure pin 17.	approx. 16 mADC	-	-
F18 (X1409)	**"Close"**	Vent flap not operated	0 VDC	0 VDC	0 VDC
		Vent flap closes (LED OFF)	12 VDC	12 VDC	0 VDC
		Using multimeter (ampere meter), open and measure pin 18.	approx. 16 mADC	-	-
Activation of:M016 - Servomotor, bottom air valve **(Resistance = approx. 49.1 ohms)**					
F20 (X1409)	**"Open"**	Vent flap not operated	0 VDC	0 VDC	0 VDC
		Vent flap opens (LED ON)	12 VDC	12 VDC	0 VDC
		Using multimeter (ampere meter), open and measure pin 20.	approx. 16 mADC	-	-
F15 (X1409)	**"Close"**	Vent flap not operated	0 VDC	0 VDC	0 VDC
		Vent flap closes (LED OFF)	12 VDC	12 VDC	0 VDC
		Using multimeter (ampere meter), open and measure pin 15.	approx. 16 mADC	-	-
M017 - Primary fan **(Resistance = approx. 0.9 ohms)**					
F1 (X1409)	**+supply to relay no. 7** + UB 30 Fuse F19 (X1440)	Ignition OFF	12 VDC	0 VDC	12 VDC
F3 (X1409)	**Signal**				
	Engine is running	Primary fan OFF	0 VDC	0 VDC	0 VDC
		Primary fan ON	14 VDC	14 VDC	0 VDC
S035 - Switch, high-pressure/low-pressure (air conditioning system); **Y024** - Magnetic clutch, air conditioning com-pressor					
E2 (X1408)	**+ supply Y024 magnetic clutch** Engine is running	Air conditioning OFF	0 VDC	0 VDC	0 VDC
		Air conditioning ON	14 VDC	14 VDC	0 VDC

Pin	Pin description	Signal type/condition	Signal	Wire interrupted	
				Signal from A038 ECU	Signal from compo-nent
		Using multimeter (ampere meter), open and measure pin 2.	approx. 3.5 ADC	-	-
C15 (X1406)	**S035 switch** Engine is running	Air conditioning OFF	0 VDC	0 VDC	0 VDC
		Air conditioning ON, Switch closed	14 VDC	0 VDC	14 VDC

NOTE: *see §6*

13 A038 sockets

Circuit diagram: sockets

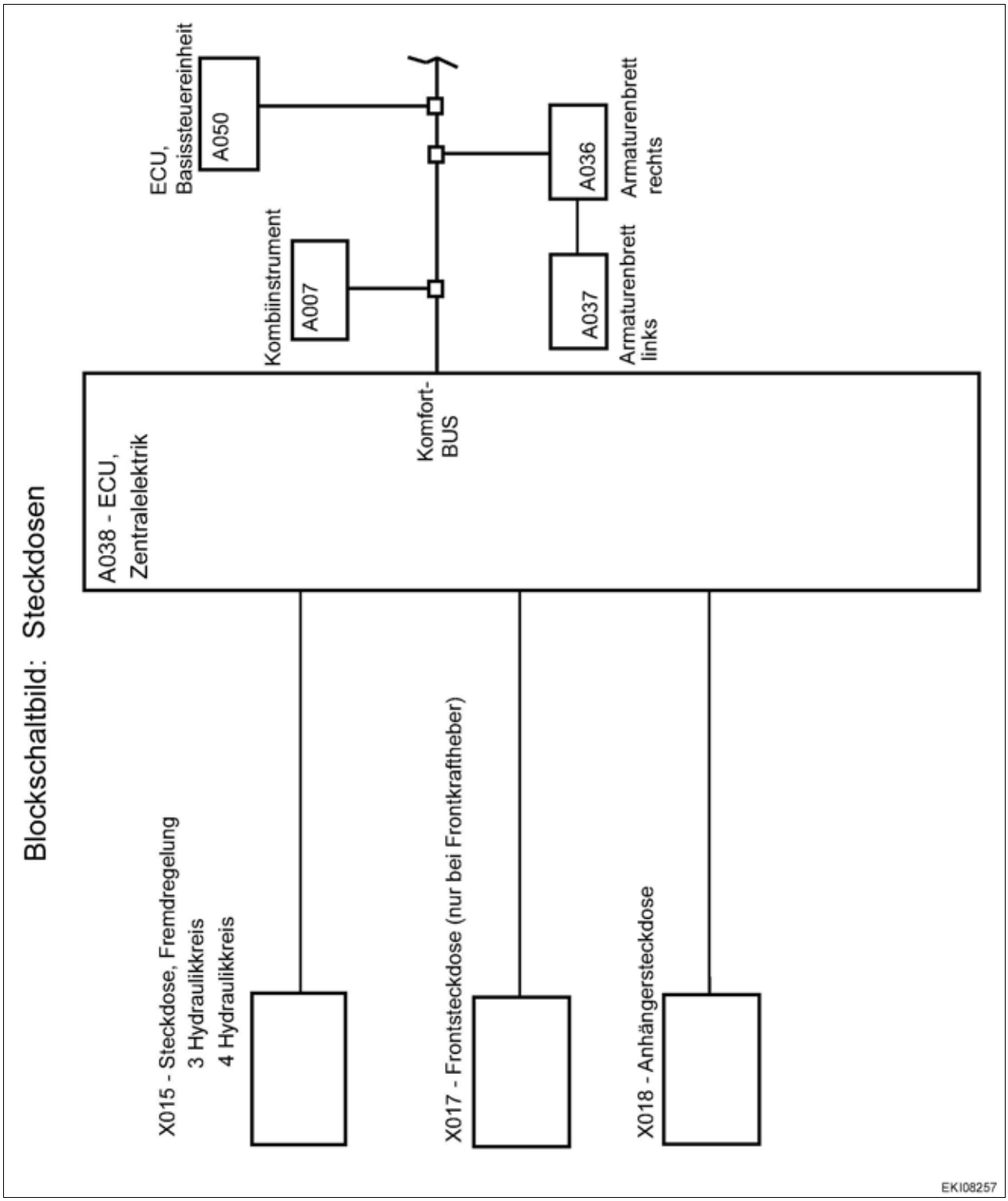


Fig. 45. I002018

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see §16*

Prerequisite for this measurement:

– Switch on ignition.
– Use the **vehicle earth** to **earth**

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
X015 - External control socket					
F21 (X1409)	**+supply to relay no. 6** + UB 30 Fuse F20 (X1440) **"Hydraulic circuit 3"**	Ignition OFF	12 VDC	0 VDC	12 VDC
F19 (X1409)	**Signal "Hydraulic circuit 3" (terminal 54)** Engine is running	3. Hydraulic circuit not operated	0 VDC	0 VDC	0 VDC
		3. Hydraulic circuit operated	14 VDC	14 VDC	0 VDC
A21 (X1404)	**+supply to relay no. 8** + UB 30 Fuse F21 (X1440) **"Hydraulic circuit 4"**	Ignition OFF	12 VDC	0 VDC	12 VDC
A19 (X1404)	**Signal "Hydraulic circuit 4" (terminal 58L)** Engine is running	4. Hydraulic circuit not operated	0 VDC	0 VDC	0 VDC
		4. Hydraulic circuit operated	14 VDC	14 VDC	0 VDC
Activation of: **X017** - Front socket **(only for front power lift)** **Activation of**: **X018** - Rear socket					
B5 (X1405)	**Signal X017 / X018 socket "left direction indicator (L)"**	Left direction indicator (L) OFF	0 VDC	0 VDC	0 VDC
		Left direction indicator (L) ON	12 VDC intermittent	12 VDC intermittent	0 VDC
B3 (X1405)	**Signal "Right direction indicator (R)"**	Right direction indicator (R) OFF	0 VDC	0 VDC	0 VDC
		Right direction indicator (R) ON	12 VDC intermittent	12 VDC intermittent	0 VDC
B7 (X1405)	**Signal "Left wide vehicle marker light/tail light (58L)"**	"Left wide vehicle marker light/tail light (58L)" OFF	4.4 VDC not loadable	4.4 VDC not loadable	0 VDC
		"Left wide vehicle marker light/tail light (58L)" ON	12 VDC	12 VDC	0 VDC
B4 (X1405)	**Signal "Right wide vehicle marker light/tail light (58R)"**	"Right wide vehicle marker light/tail light (58R)" OFF	4.4 VDC not loadable	4.4 VDC not loadable	0 VDC

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
		"Right wide vehicle marker light/tail light (58R)" ON	12 VDC	12 VDC	0 VDC
8 (X1404)	**Signal "Brake light (54)"**	Brake light OFF	12 VDC not load-able	12 VDC not loadable	0 VDC
		Brake light ON	12 VDC	12 VDC	0 VDC

NOTE: *see §6*

14 A038 starter, tank pump

Circuit diagram: starter, tank pump

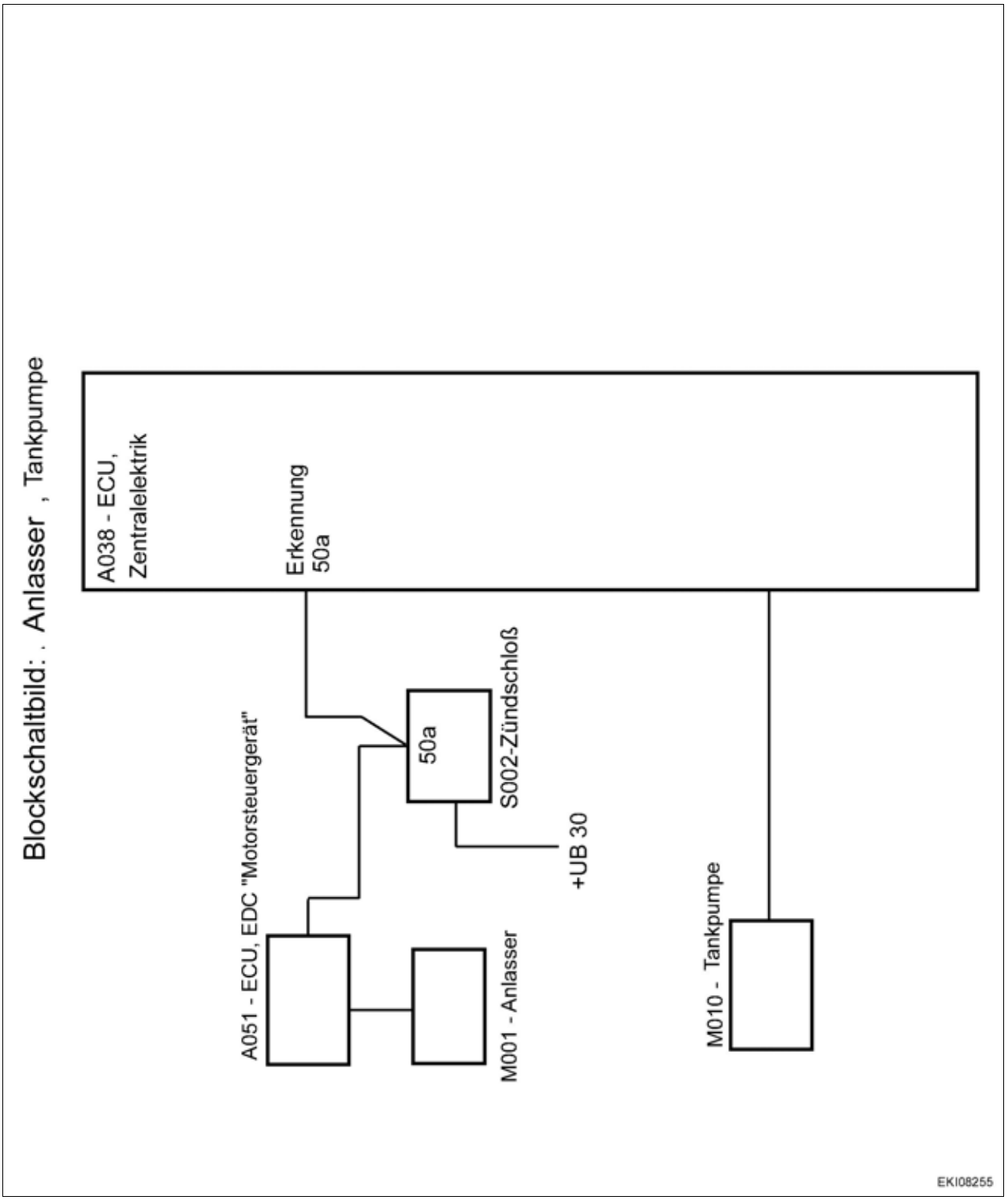


Fig. 46. I002379

Circuit diagram: starter control

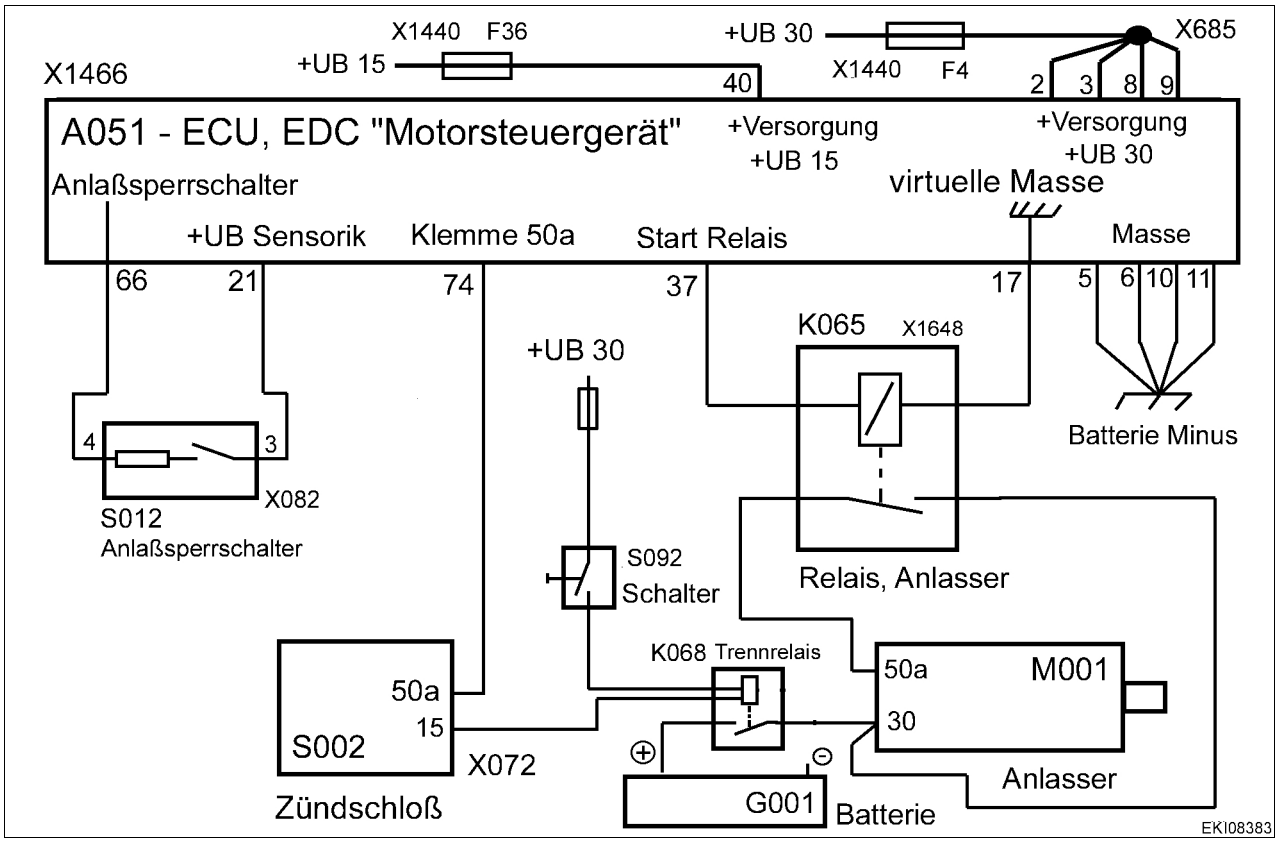


Fig. 47. I007332

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see §16*

Item	Designation	Item	Designation
A038	ECU, central electrical system **Note:** The ECU, central electrical system recognises the engine start process (terminal 50a). During start process, the A038 central electrical system switches off consumers which use high levels of power (e.g. work light).	**M001** - starter.	
A051 - ECU, engine control unit (EDC 7).		**S002** - Switch, ignition	
G001 - Battery 1		**S012** - Switch, starter lockout	
K065 - Starter relay **K065** - Starter relay		**S092** - Battery disconnect switch	
		X1440 - Fuse holder	
K068 - Relay, battery disconnect (impulse)			

Prerequisite for this measurement:

- Switch on ignition.
- Use the **vehicle earth** to **earth**

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
Detection of: **S002** - Switch, ignition **(Terminal 50a)**					
E8 (X1408)	**Note:** The A038 ECU, central electrical system recognises the diesel engine start process. During start process, consumers which use high levels of power (e.g. work light) are briefly switched off. **Note:** Do not activate the drive transmission during the start process (prevents engine from starting).				
		Ignition ON.	1.5 VDC not loadable	1.5 VDC not loadable	0 VDC
		Ignition switch in position "Start"	12 VDC	0 VDC	12 VDC
Activation of: M010 - Fuel pump "Circulation pump" (resistance = 5.6 ohms)					
F9 (X1409)	**Fuel pump switches on when:** – Diesel engine is running - **B034** - Immersed tube sensor (fuel) showing fewer than 4 bars				
		Fuel pump OFF	0 VDC	0 VDC	0 VDC
		Fuel pump ON	14 VDC	14 VDC	0 VDC
		Using multimeter (ampere meter), open and measure pin 9.	Approx. 0.72 ADC	-	-

NOTE: *see §6*

15 A038 - "Rüfa" reverse drive control

Circuit diagram: reverse operation

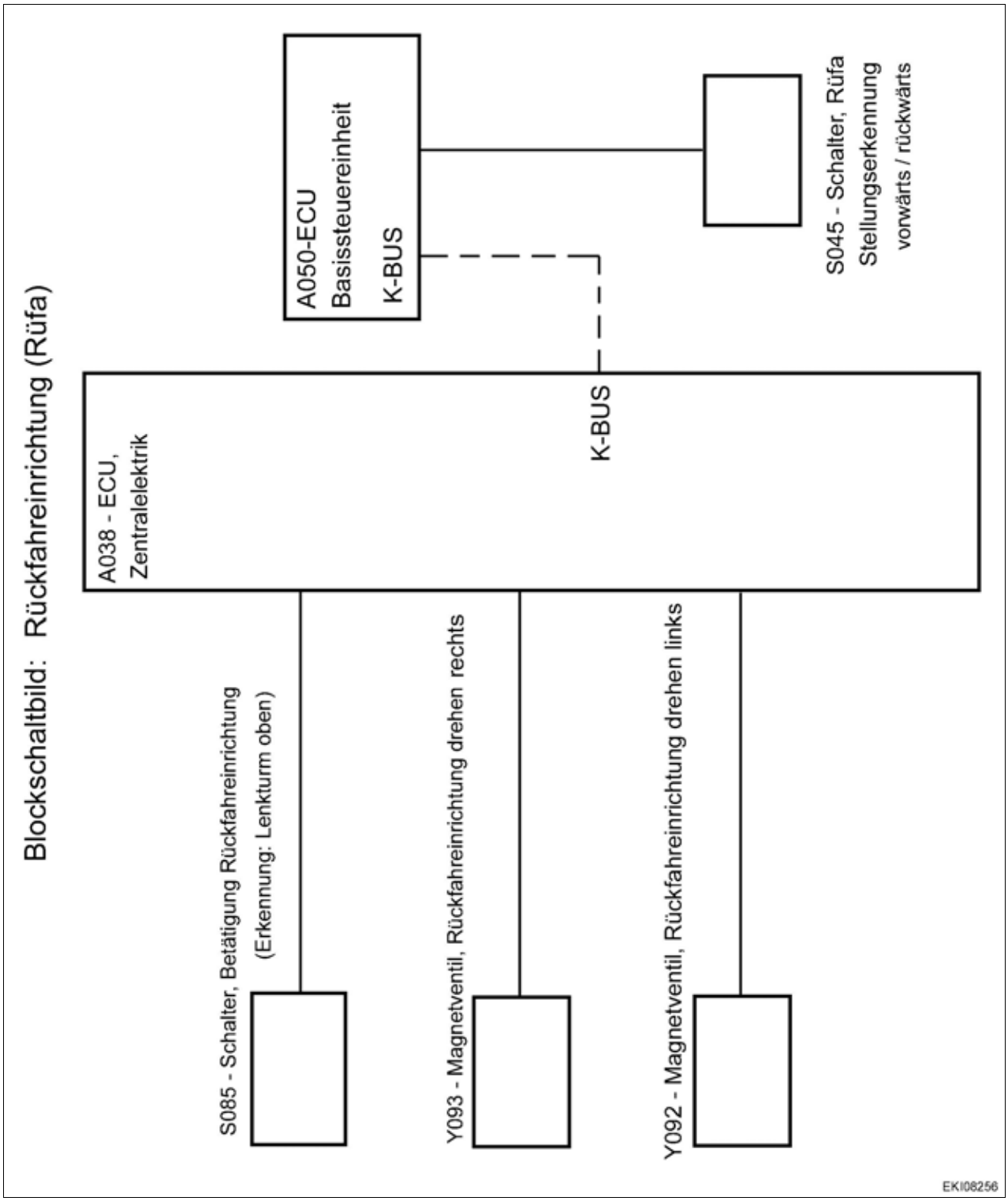


Fig. 48. I004826

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see §16*

Prerequisite for this measurement:

- Use the **vehicle earth** to **earth**
- Compressed air system filled
- Engine OFF
- Switch on ignition.
- Hand brake applied

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
Detection of: S085 - Switch, reverse operation (RÜFA) actuation **(detection: steering column, top)**					
B2 (X1405)	**Signal**	Steering column bottom (solenoid removed from switch) (switch open) (resistance = infinite)	0 VDC	0 VDC	0 VDC
		Steering column raised (solenoid is upstream of switch) (switch closed) (resistance = approx. 3.9 ohms)	approx. 12 VDC	0 VDC	approx. 12 VDC
Activation of:Y092 - Solenoid valve, reverse operation (RÜFA), rotate to left					
D2 (X1407)	**Signal**	Rotary drive not operated	0 VDC	0 VDC	0 VDC
		Rotary device operated	12 VDC (approx. 0.87 ADC)	12 VDC	0 VDC
Activation of:Y093 - Solenoid valve, reverse operation (RÜFA), rotate to right					
B1 (X1405)	**Signal**	Rotary drive not operated	0 VDC	0 VDC	0 VDC
		Rotary device operated	12 VDC (0.87 ADC)	12 VDC	0 VDC

NOTE: *see §6*
see §1

3 Checking the A038 ECU, central electrical system



Fig. 7. I007509

Adapter cable X899.980.304.203 for connection to **A038** - ECU, central electrical system

Left front end, at connector (S1)
YELLOW adapter cable connection
(Measurement: cabling to component)

Right front end, at connector (S2)
GREEN adapter cable connection
(Measurement: to electronics box)

NOTE: *Check the connector coding when connecting the adapter cable.*

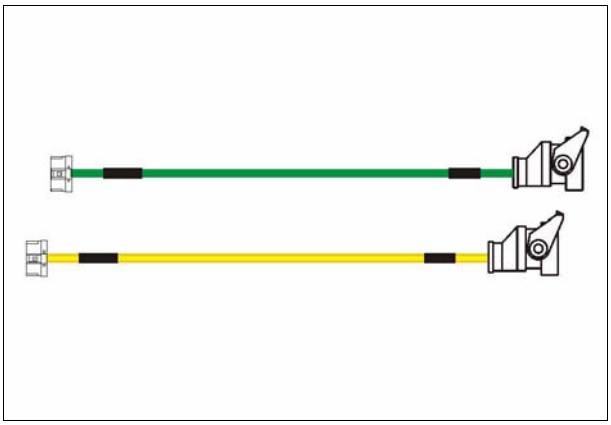


Fig. 8. I007521

IMPORTANT: *Check the adapter box pin range*

X1404 = pins 1 - 21 - connector designation **A**
X1405 = pins 1 - 21 connector designation **B**
X1406 = pins 1 - 21 - connector designation **C**
X1407 = pins 1 - 21 - connector designation **D**
X1408 = pins 1 - 21 - connector designation **E**
X1409 = pins 1 - 21 - connector designation **F** on wiring diagram
See the adapter box measuring range area outlined in **RED**.

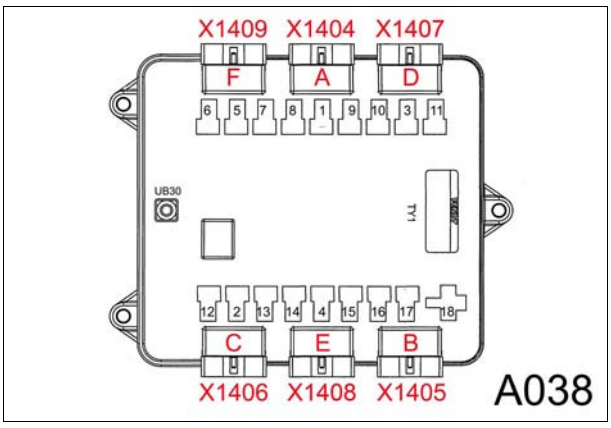


Fig. 9. I007524

NOTE: *see also §7, Page 8 "Various measurement possibilities using the adapter box (160-pin)"*

17 A039 multifunction armrest (MFA) and driver seat

A039 - MFA, multifunction armrest connection on control bus (K bus)

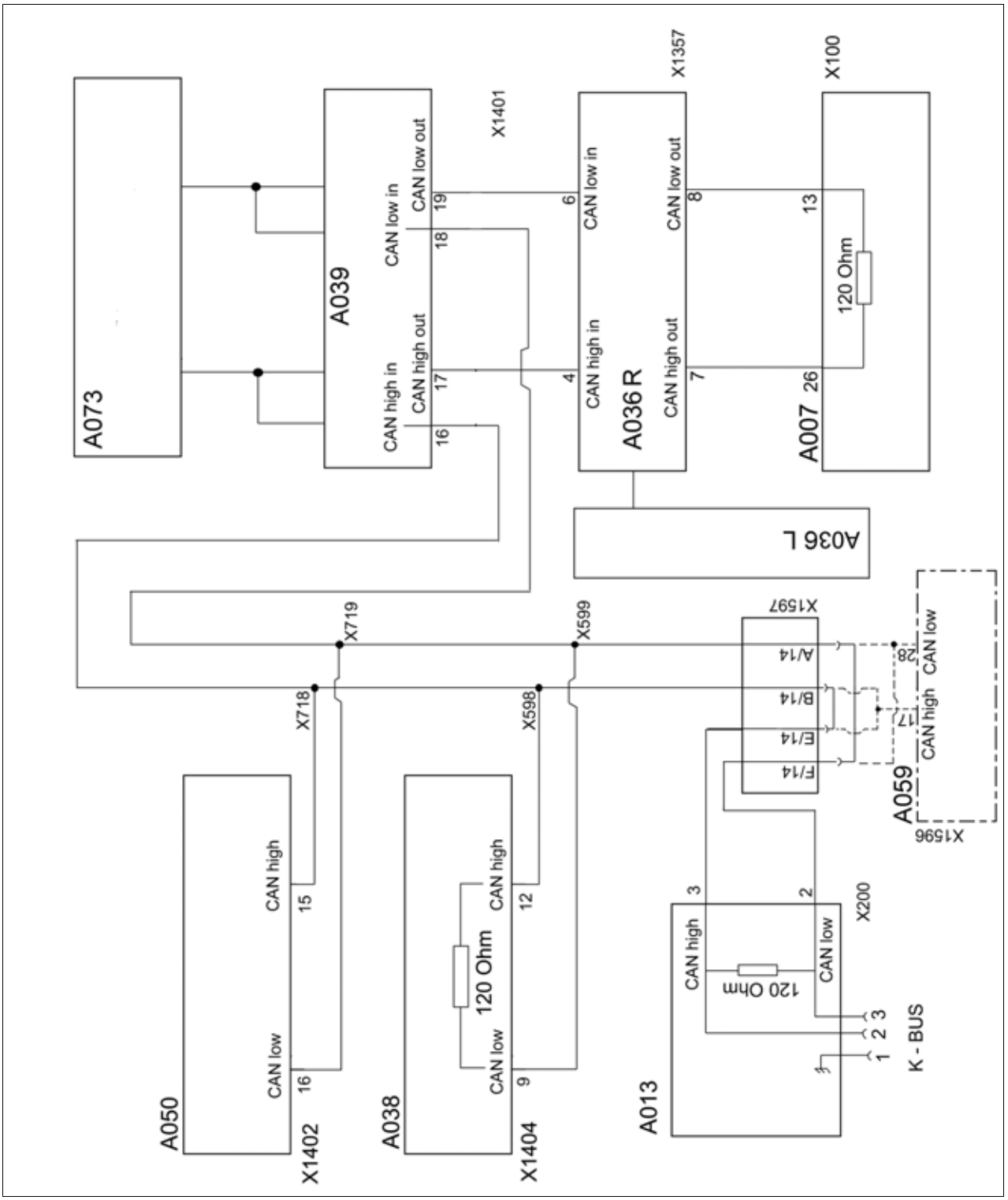


Fig. 50. Control bus, version A (to 9../../1700) I007392

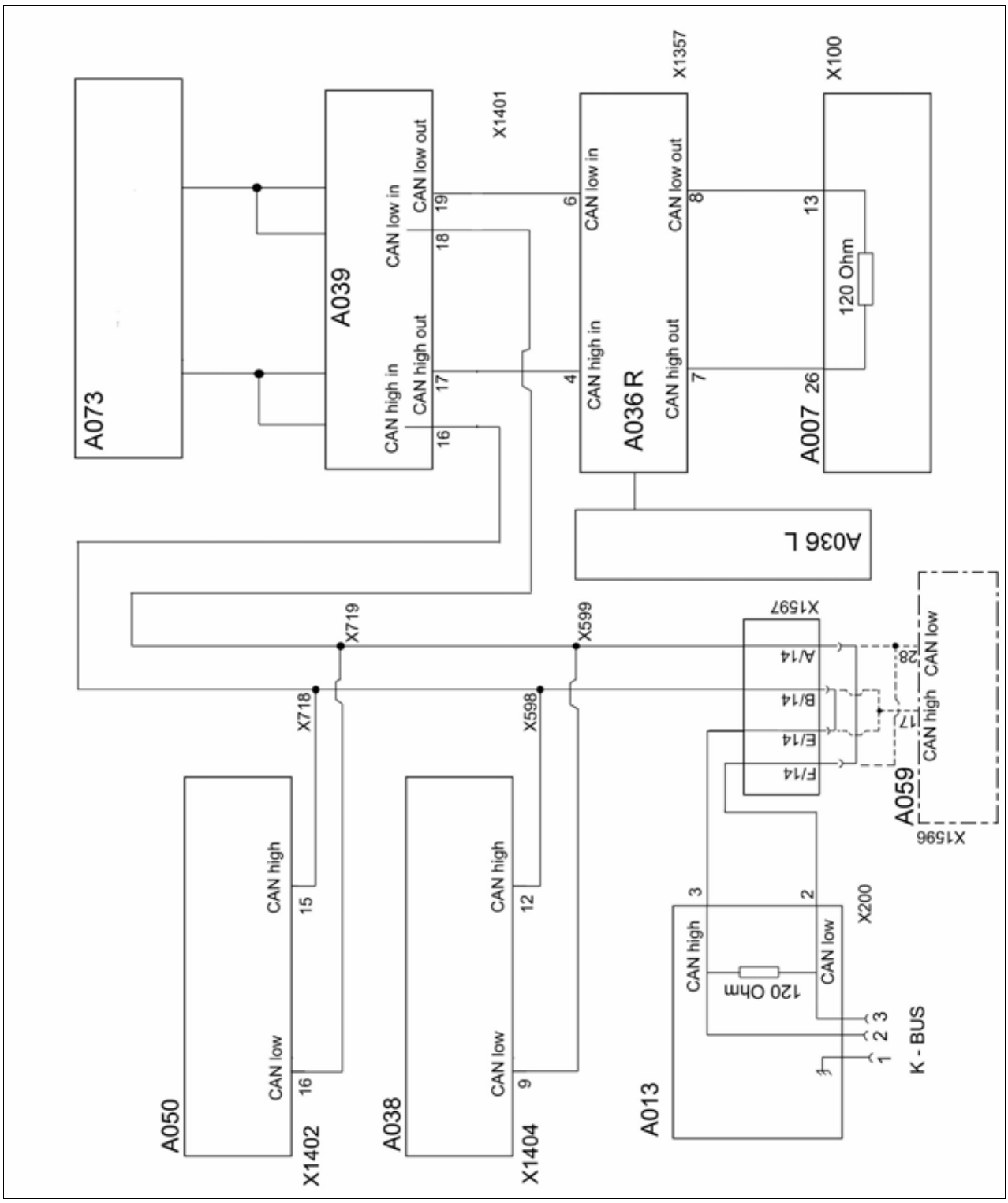


Fig. 51. Control bus, version B (from 9../../1701) I007393

+ supply to **A039** - MFA, multifunction armrest

NOTE: *Connect X899.980.208.205* ***adapter cable (31/68-pin)***

Connect the X899.980.304.000 adapter box and the X899.980.304.204 adapter cable (intermediate cable) to the ***A039*** *- MFA, multifunction armrest and measure the pins (see table).* *see §18*

+ UB 30 (battery voltage)				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
+ supply	26			F6 fuse (in X1440) **G001** - Battery 1 **K068** - Relay, battery disconnect (impulse) or in wiring set
		12 VDC	Ignition OFF	
		14 VDC	Engine is running	
Vehicle earth	29			
+ supply	26	Voltage drop max. 1 VDC from last reading	Also connect approx. 55 W bulb	Voltage must remain stable even under load. If voltage drop is greater than approx. 1 VDC, remove contact resistors (e.g. at fuse).
Vehicle earth	29			

+UB 15 (switched voltage; ignition switch)				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
+ supply	25			F36 fuse (in X1440) **G001** - Battery 1 **K068** - Relay, battery disconnect (impulse) or in wiring set
		0 VDC	Ignition OFF	
		12 VDC	Ignition ON.	
Vehicle earth	29			
+ supply	25	Voltage drop max. 1 VDC from last reading	Also connect approx. 55 W bulb	Voltage must remain stable even under load. If voltage drop is greater than approx. 1 VDC, remove contact resistors (e.g. at fuse).
Vehicle earth	29			

+UB15 (+supply for the;E106 - Exterior mirror (adjustment/heater), right E107 - Exterior mirror (adjustment/heater), left)				
Test	**Pi**n	**Specified value**	**condition**	**Possible cause of fault**
+ supply	10			F45 fuse (in X1440) **G001** - Battery 1 **K068** - Relay, battery disconnect (impulse) or in wiring set
		0 VDC	Ignition OFF	
		12 VDC	Ignition ON.	
Vehicle earth	29			

+UB15 (+supply for the;E106 - Exterior mirror (adjustment/heater), right E107 - Exterior mirror (adjustment/heater), left)				
+ supply	10	Voltage drop max. 1 VDC from last reading	Also connect approx. 55 W bulb	Voltage must remain stable even under load. If voltage drop is greater than approx. 1 VDC, remove contact resistors (e.g. at fuse).
Vehicle earth	29			

Pin assignment and signal values

Prerequisite for this measurement:

– Ignition on

NOTE: *All readings +/- 10%*

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
A039 - MFA, multifunction armrest **(operator's seat area: seat switch and compressor)**					
1	**Seat switch Signal**	**Driver seat not loaded** Switch open 510 ohms	3.7 VDC	0 VDC	6.1 VDC
		Driver seat loaded Switch closed 121 ohms	1.8 VDC		
2	**Seat switch, Sensor system earth**				
13	**+ supply to air compressor** on driver seat and for seat heater	Driver seat and/or seat heater not actuated	12 VDC	0 VDC	12 VDC
		Pump up driver seat (com-pressor)	10 VDC		
	Note: Compressor = 1.0 ohms Seat heater = 2.3 ohms Compressor + Seat heater = 0.8 ohms	Using multimeter (ampere meter), open and measure pin 13. **Pump up driver seat (compressor)**	6.0 ADC		
		Switch on seat heater	10 VDC		
		Using multimeter (ampere meter), open and measure pin 13. **Switch on seat heater**	4.9 ADC		
		Pump up driver seat (com-pressor) and **Switch on seat heater**	8 VDC		

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
		Using multimeter (ampere meter), open and measure pin 13. **Pump up driver seat (compressor)** and **Switch on seat heater**	11.3 ADC		
12	**Air compressor and seat heater earth (earth is actuated)**				
E107 - Exterior mirror (adjustment/heater), left					
7	Horizontal adjustment actuation	Mirror, horizontal adjustment	12 VDC	12 VDC	0 VDC
		Using multimeter (ampere meter), open and measure pin 7. Mirror, horizontal adjustment	approx. 0.15 to 0.30 ADC	-	-
4	Sensor system earth for horizontal adjustment				
E107 - Exterior mirror (adjustment/heater), left					
9	Vertical adjustment actuation	Mirror, vertical adjustment	12 VDC	12 VDC	0 VDC
		Using multimeter (ampere meter), open and measure pin 9. Mirror, vertical adjustment	approx. 0.15 to 0.30 ADC	-	-
5	Sensor system earth for vertical adjustment				
E110 - Exterior mirror (adjustment/heater), right					
6	Horizontal adjustment actuation	Mirror, horizontal adjustment	12 VDC	12 VDC	0 VDC
		Using multimeter (ampere meter), open and measure pin 6. Mirror, horizontal adjustment	approx. 0.15 to 0.30 ADC	-	-
4	Sensor system earth for horizontal adjustment				
E110 - Exterior mirror (adjustment/heater), right					
8	Vertical adjustment actuation	Mirror, vertical adjustment	12 VDC	12 VDC	0 VDC
		Using multimeter (ampere meter), open and measure pin 8. Mirror, vertical adjustment	approx. 0.15 to 0.30 ADC	-	-
5	Sensor system earth for vertical adjustment				

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
Control bus (K bus) "Version A" to 9../../1700 Terminating resistances: - **A007** - Instrument panel (120 Ohm) - **A013** - PCB, microfuses (120 Ohm) - **A038** - ECU, central electrical system (120 Ohm) **Total resistance = approx. 40 ohms**					
16	K bus, high in	Resistance	approx. 40 ohms		
18	K bus, low in				
17	K bus, high out	Resistance	approx. 40 ohms		
19	K bus, low out				
Control bus (K bus) "Version B" from 9../../1701 Terminating resistances: - **A007** - Instrument panel (120 Ohm) - **A013** - PCB, microfuses (120 Ohm) **Total resistance = approx. 60 ohms**					
16	Control bus_High In	Resistance	approx. 60 ohms		
18	Control bus_Low In				
17	Control bus_High Out	Resistance	approx. 60 ohms		
19	Control bus_Low Out				
ISO bus Terminating resistance: - **X400** - Rear ISO implement socket (120 Ohm) Total resistance = 120 ohms					
20	ISO bus_High In	Resistance	120 ohms		
22	ISO bus_Low In				
21	ISO bus_High Out	Resistance	120 ohms		
23	ISO bus_Low Out				
Earth					
29	Tractor body earth				
28	Standard earth				
27	Electronics earth				
11	Electronics earth				

4 Checking the A039 - MFA, multifunction armrest



Fig. 10. I007527

Intermediate adapter cable (A) X899.980.304.204 and adapter cable (B) X899.980.208.205 for connection to **A039** - MFA, multifunction armrest

Left front end, at connector (S1)
YELLOW adapter cable connection
(Measurement: cabling to component)

Right front end, at connector (S2)
GREEN adapter cable connection
(Measurement: to electronics box)

NOTE: *Check the connector coding when connecting the adapter cable.*

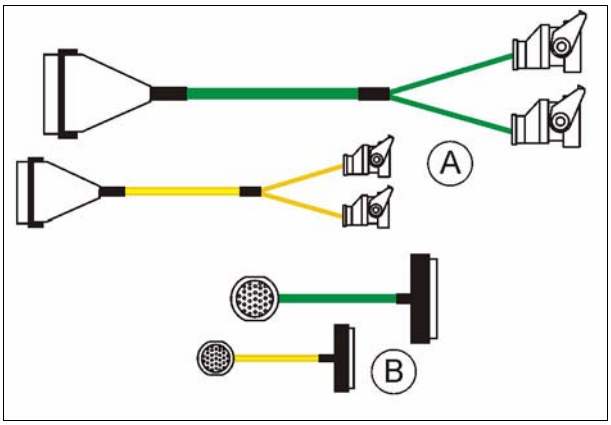


Fig. 11. I007526

IMPORTANT: *Check the adapter box pin range*

X1401 = pins 1-29

See the adapter box measuring range area outlined in **BLUE**.

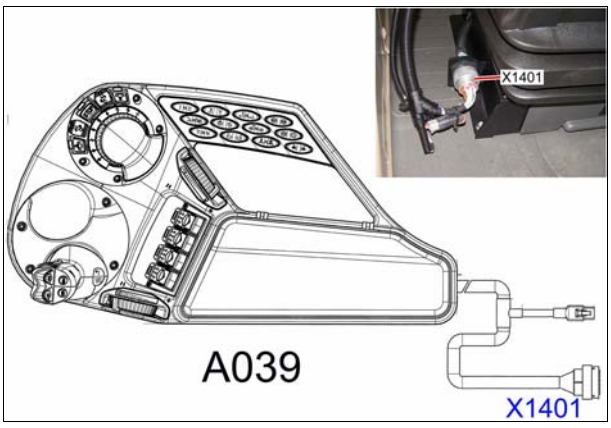


Fig. 12. I007531

NOTE: *see also §7, Page 8 "Various measurement possibilities using the adapter box (160-pin)"*

19 A050 +supply

Checking the +supply to **A050** - ECU, basic control unit

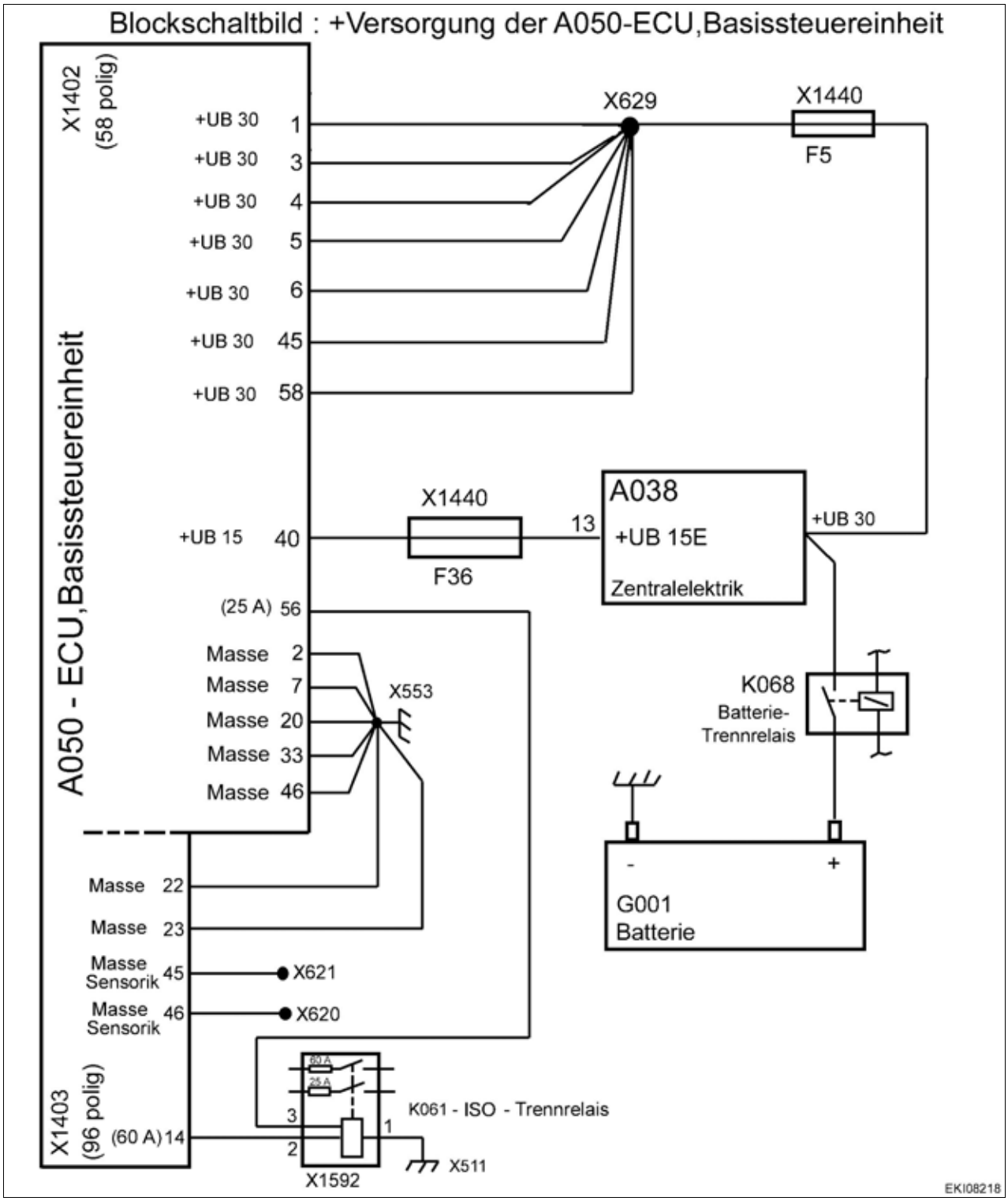


*Fig. 53. Circuit diagram: + supply of the **A050** - ECU, basic control unit* I002737

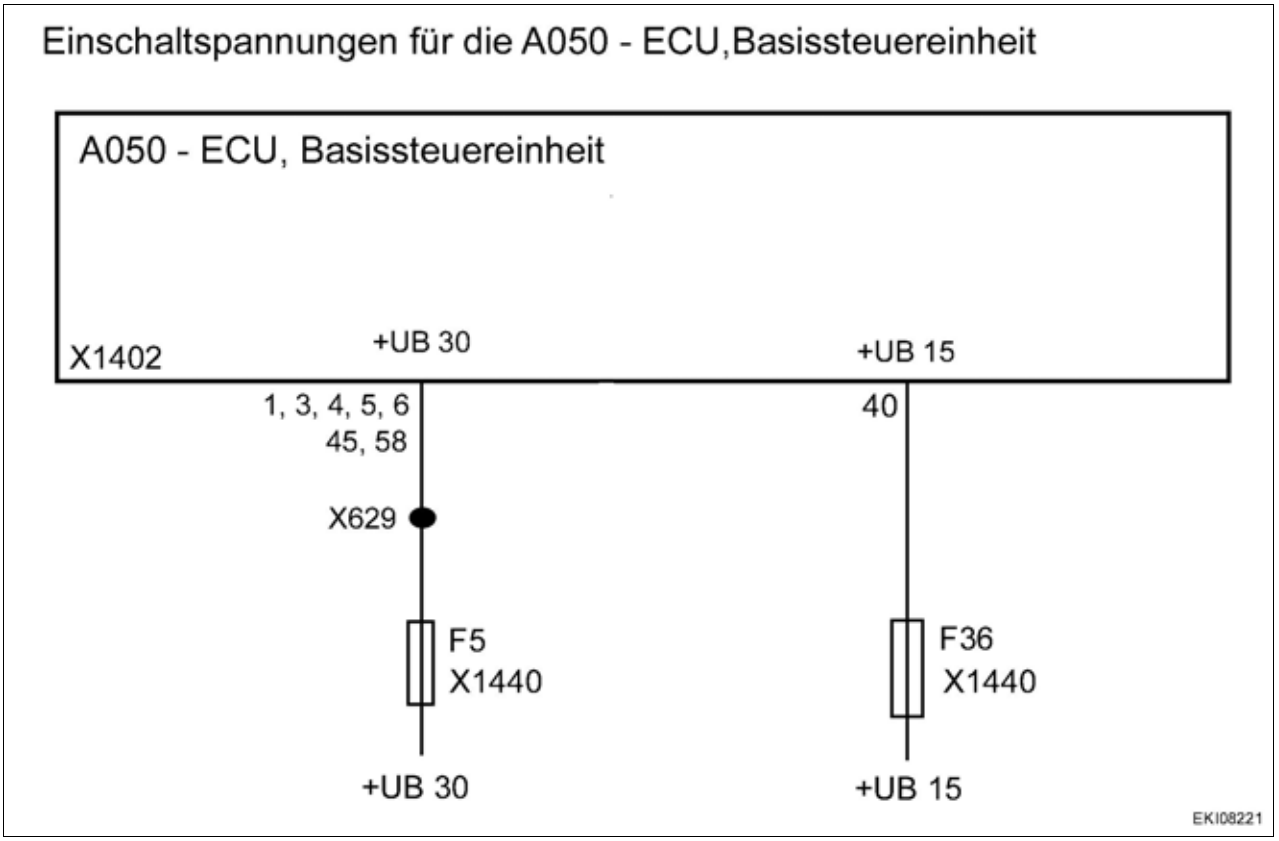


*Fig. 54. Switch on voltages for the **A050** - ECU, basic control unit* I002738

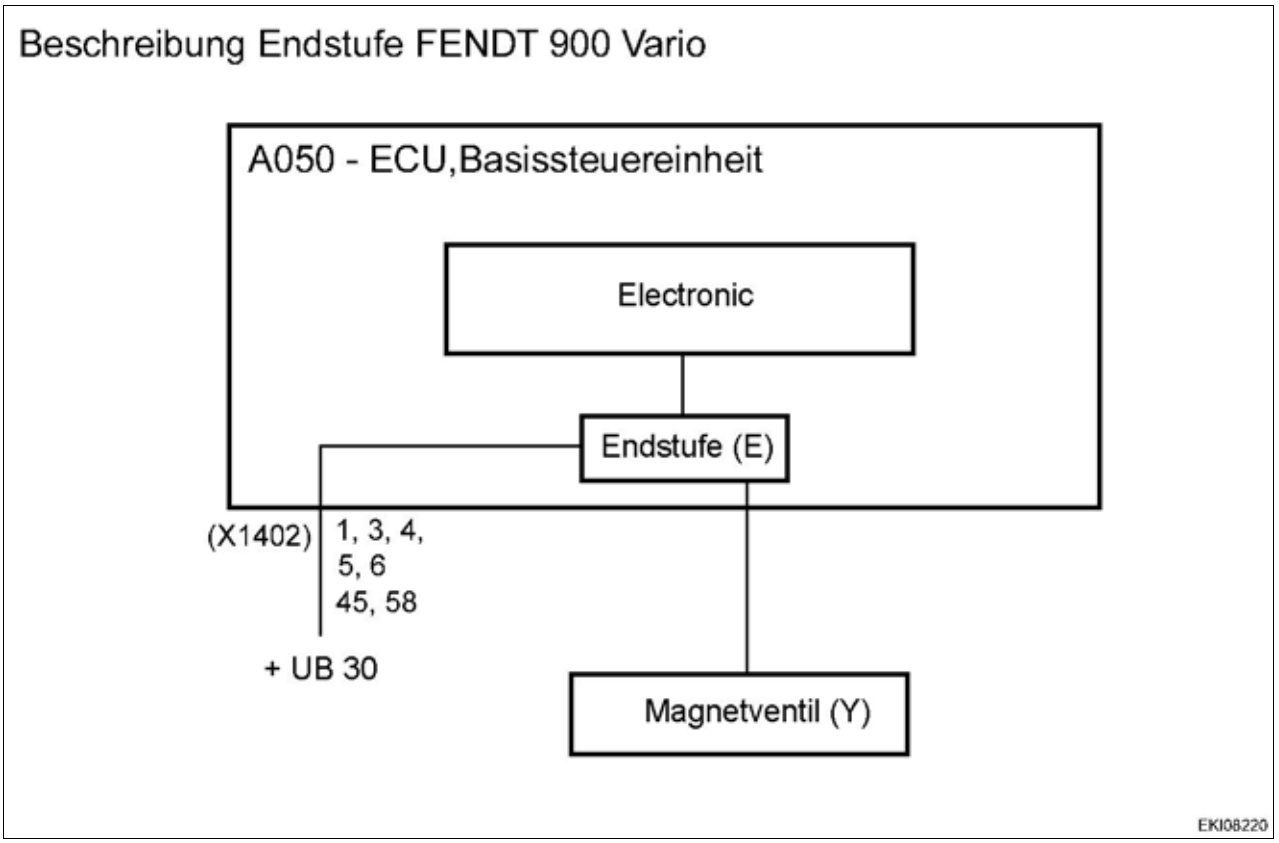


*Fig. 55. End stages on the **A050** - ECU, basic control unit* I002739

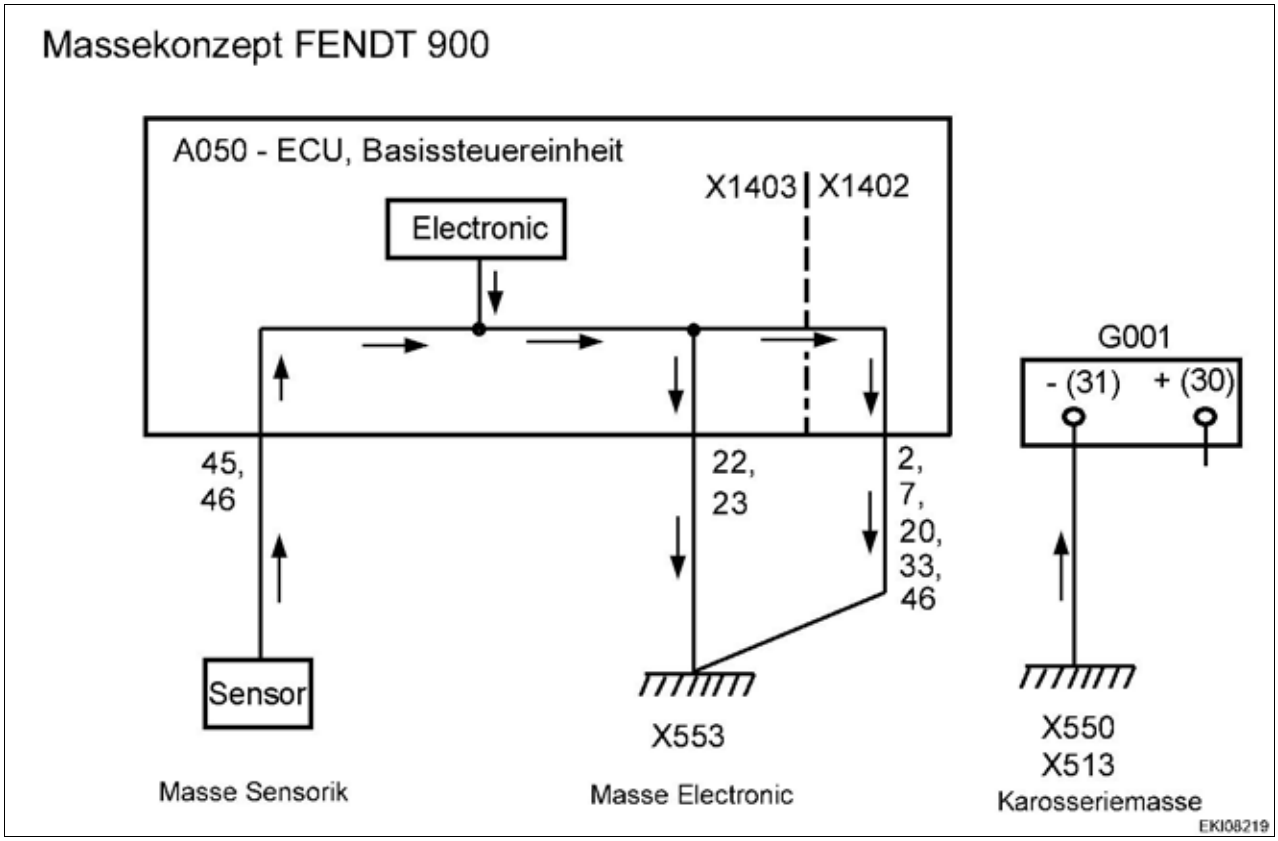


*Fig. 56. Earth layout of the **A050** - ECU, basic control unit* I002740

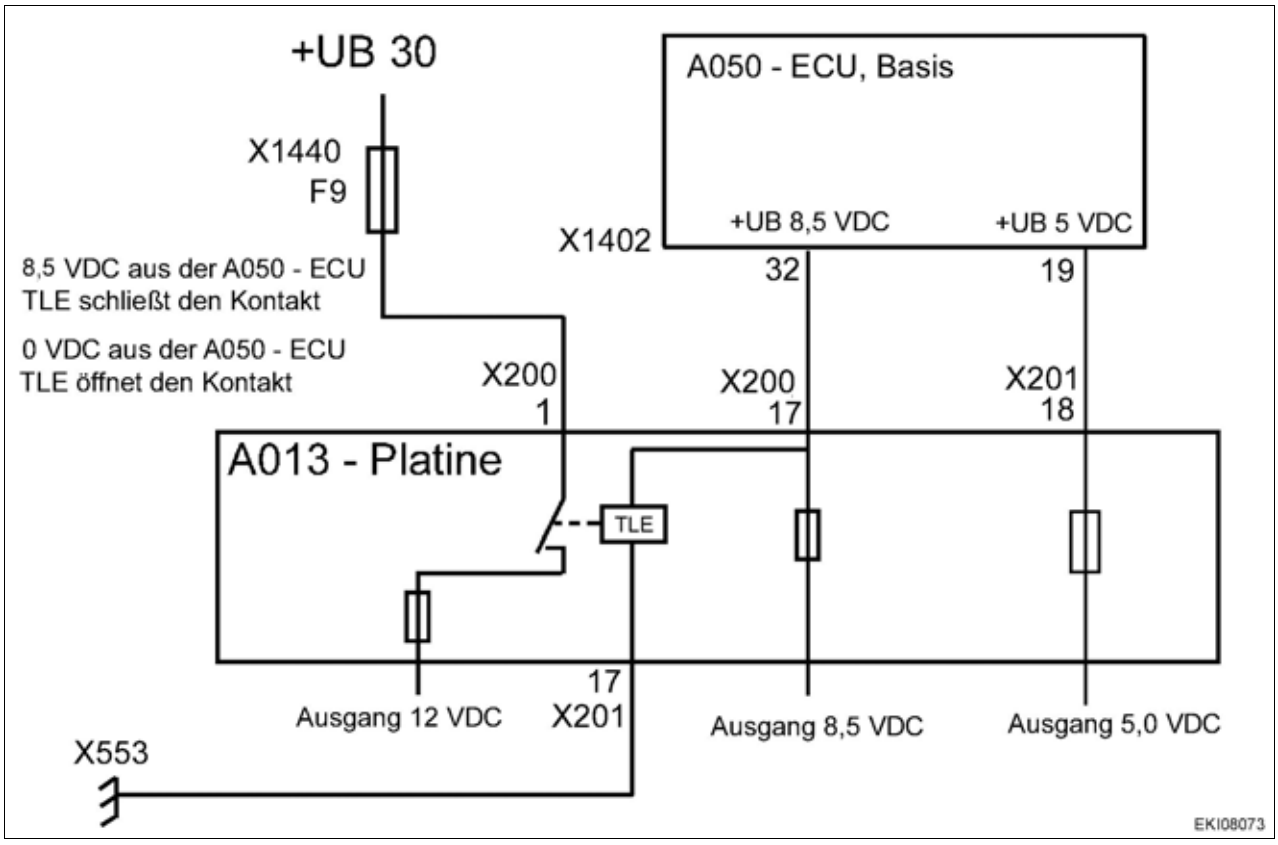


*Fig. 57. + supply from the **A050** - ECU, basic control unit to the **A013** - PCB, microfuses* I002328

Measuring points and signal values

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.201 adapter cable to the **A050** - ECU, basic control unit and measure the pins (see table).* *see §34*

Prerequisite for this measurement:

– Measure earth to pin 2 (X1402)
– Measure following pins on **X1402 [B]** - Separation point on A050

Measuring the supply voltage				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
+ supply (+ UB 30)	**1, 3, 4, 5, 6, 45, 58**			F5 fuse (in X1440) **G001** - Battery 1 **K068** - Relay, battery disconnect (impulse) or in wiring set
			Tractor with K068 - Relay, battery disconnect (impulse)	
		0 VDC	Ignition OFF and **S092** - Battery disconnect switch interrupts the main power circuit	
		12 VDC	**S092** - Battery disconnect switch switches on main power circuit Ignition ON.	
		14 VDC	Ignition ON, Engine is running	
			Tractor withoutK068 - Relay, battery disconnect (impulse)	
		12 VDC	Ignition OFF	
		14 VDC	Ignition ON, Engine is running	
+ supply (+ UB 15)	**40**			F36 fuse (in X1440)
		0 VDC	Ignition OFF	
		12 VDC	Ignition ON.	
+ UB 5.0 VDC	**19**			+ supply to **A050** - ECU, basic control unit wiring set, or **A050** - ECU, basic control unit faulty
		0 VDC	Ignition OFF	
		5.0 VDC	Ignition ON.	
+UB 8.5 VDC	**32**			+ supply to **A050** - ECU, basic control unit wiring set, or **A050** - ECU, basic control unit faulty
		0 VDC	Ignition OFF	
		8.5 VDC	Ignition ON.	

Measuring the supply voltage				
Actuation for the K061 - ISO bus disconnect relay (25 A)	56			+ supply to **A050** - ECU, basic control unit wiring set or **A050** - ECU, basic control unit faulty
		Ignition OFF	0 VDC	
		Ignition ON.	12 VDC	
Electronics earth	**2, 7, 20, 33, 46**	-	-	-

Prerequisite for this measurement:

– Measure earth to pin 2 (X1402)
– Measure **X1403 [A]** - Separation point on A050

Test	Pin	Specified value	condition	Possible cause of fault
Actuation for the K061 - ISO bus disconnect relay (60 A)	**14**			+ supply to **A050** - ECU, basic control unit wiring set, or **A050** - ECU, basic control unit faulty
		0 VDC	Ignition OFF	
		12 VDC	Ignition ON.	
Electronics earth	**22, 23,**	-	-	-
Sensor system earth	**45, 46**	-	-	

Load + power supply (UB30/UB15) to the **A050** - ECU, basic control unit with a 55 W bulb.
Voltage drop max. 1 VDC from last reading

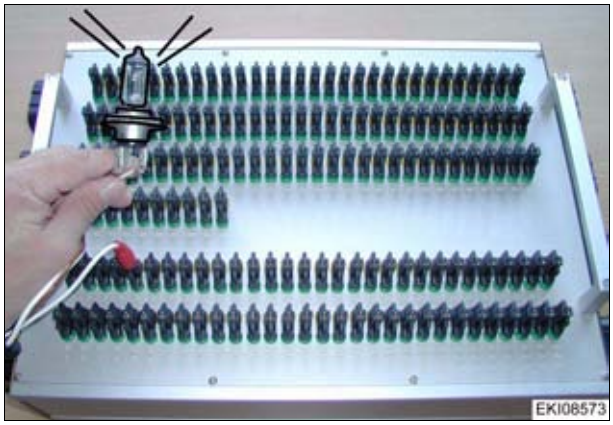


Fig. 58. I002375

20 A050 CAN bus connection

CAN bus connection to **A050** - ECU, basic control unit

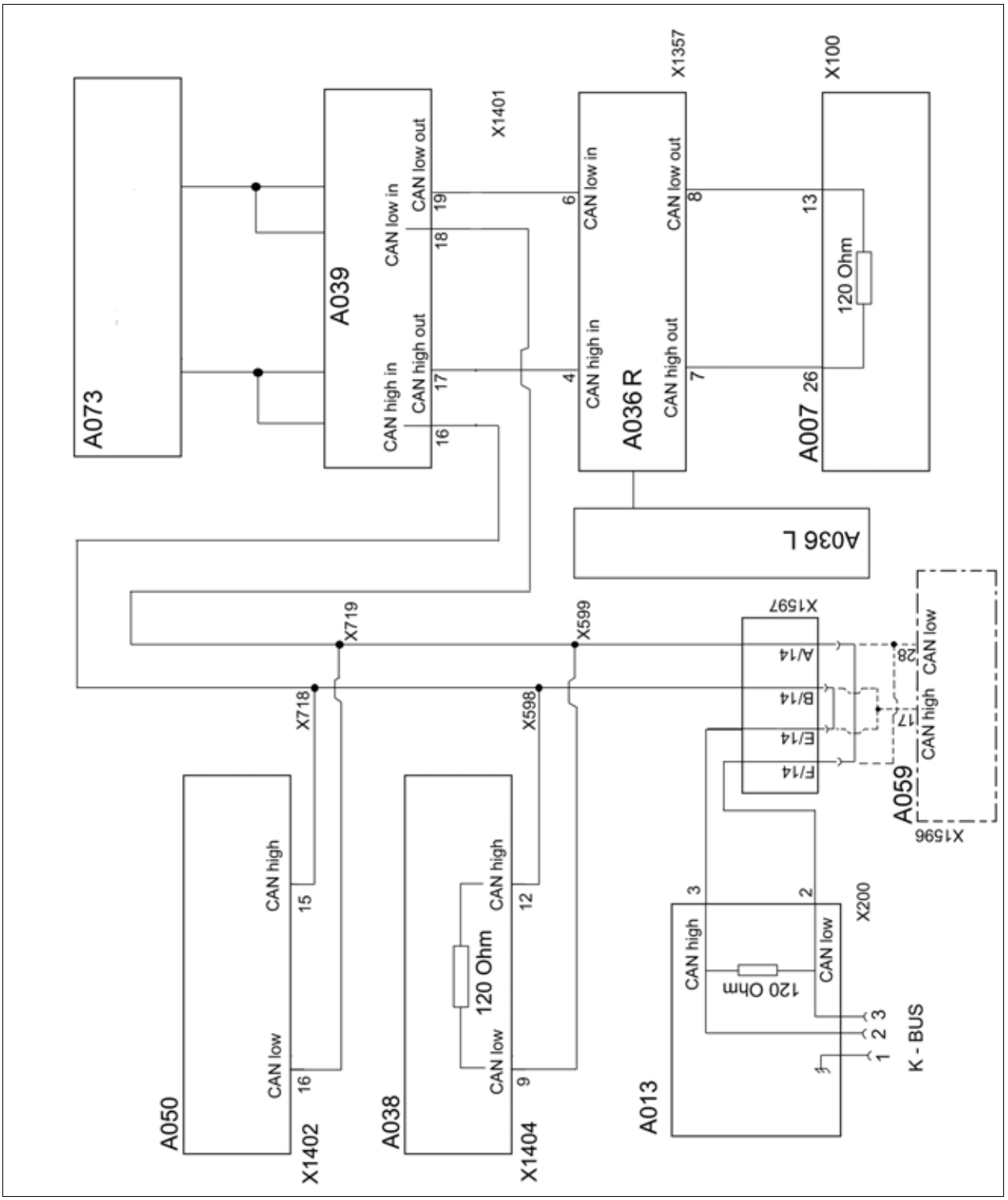


Fig. 59. Control bus, version A (to 9../../1700) I007392

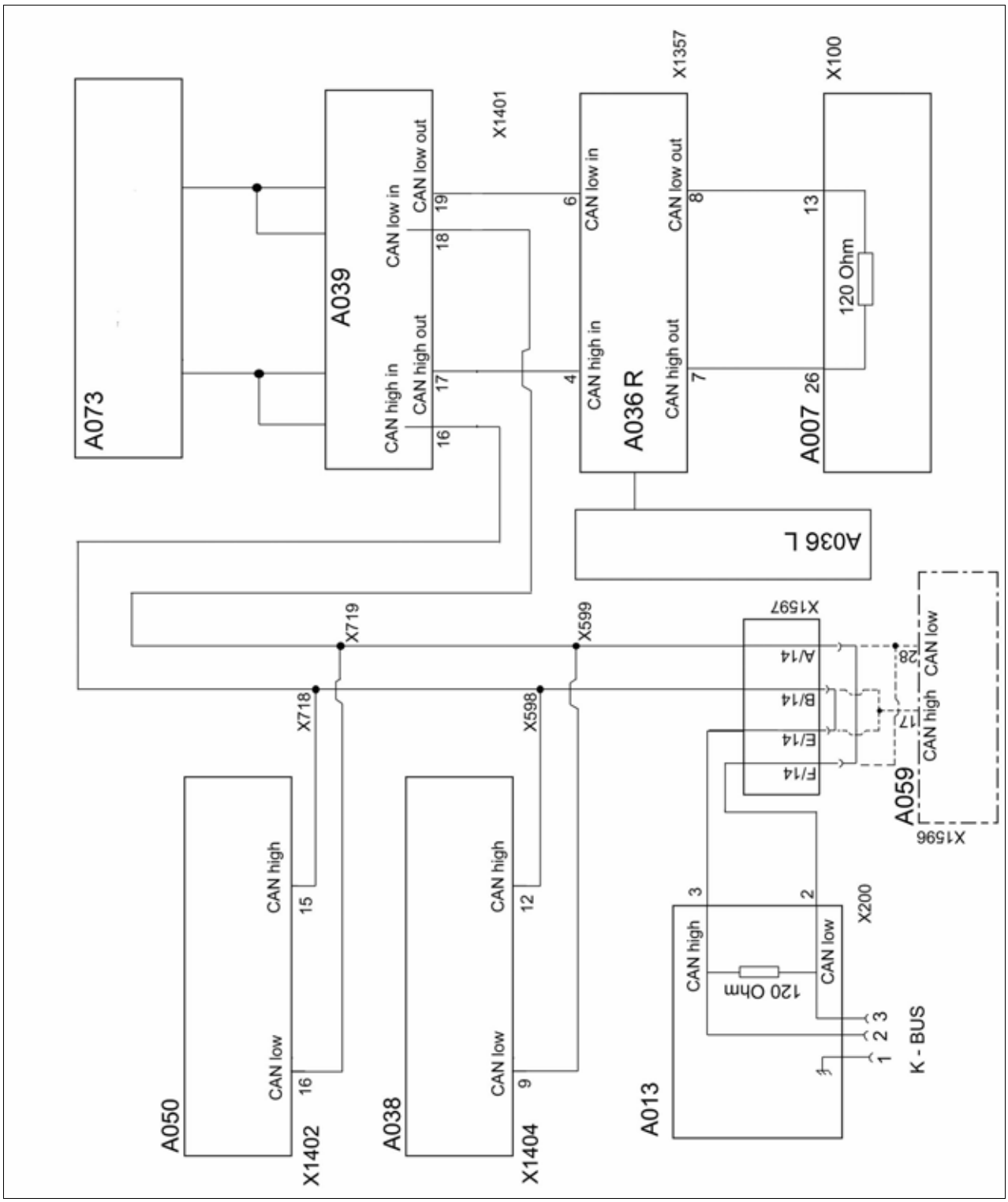


Fig. 60. Control bus, version B (from 9../../1701)

I007393

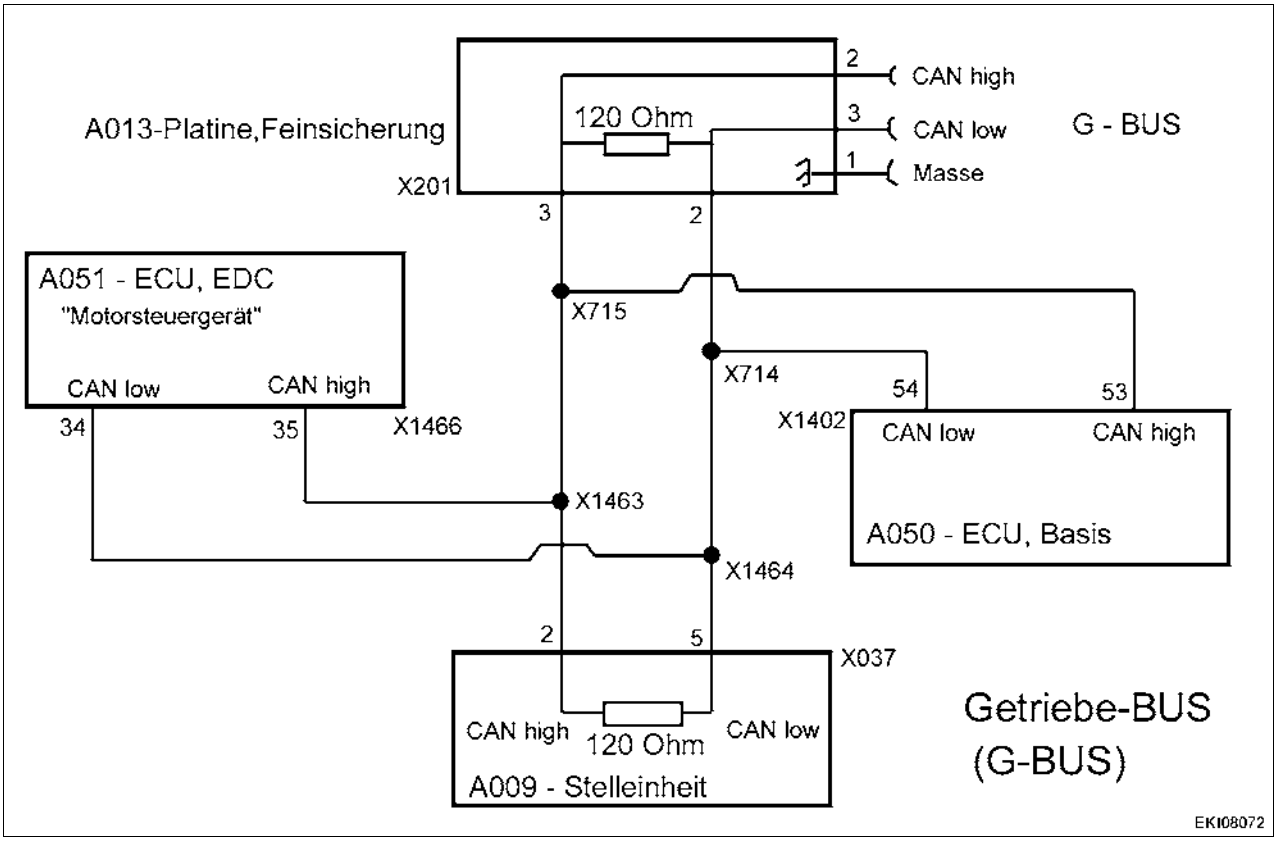


Fig. 61. Transmission bus

I000716

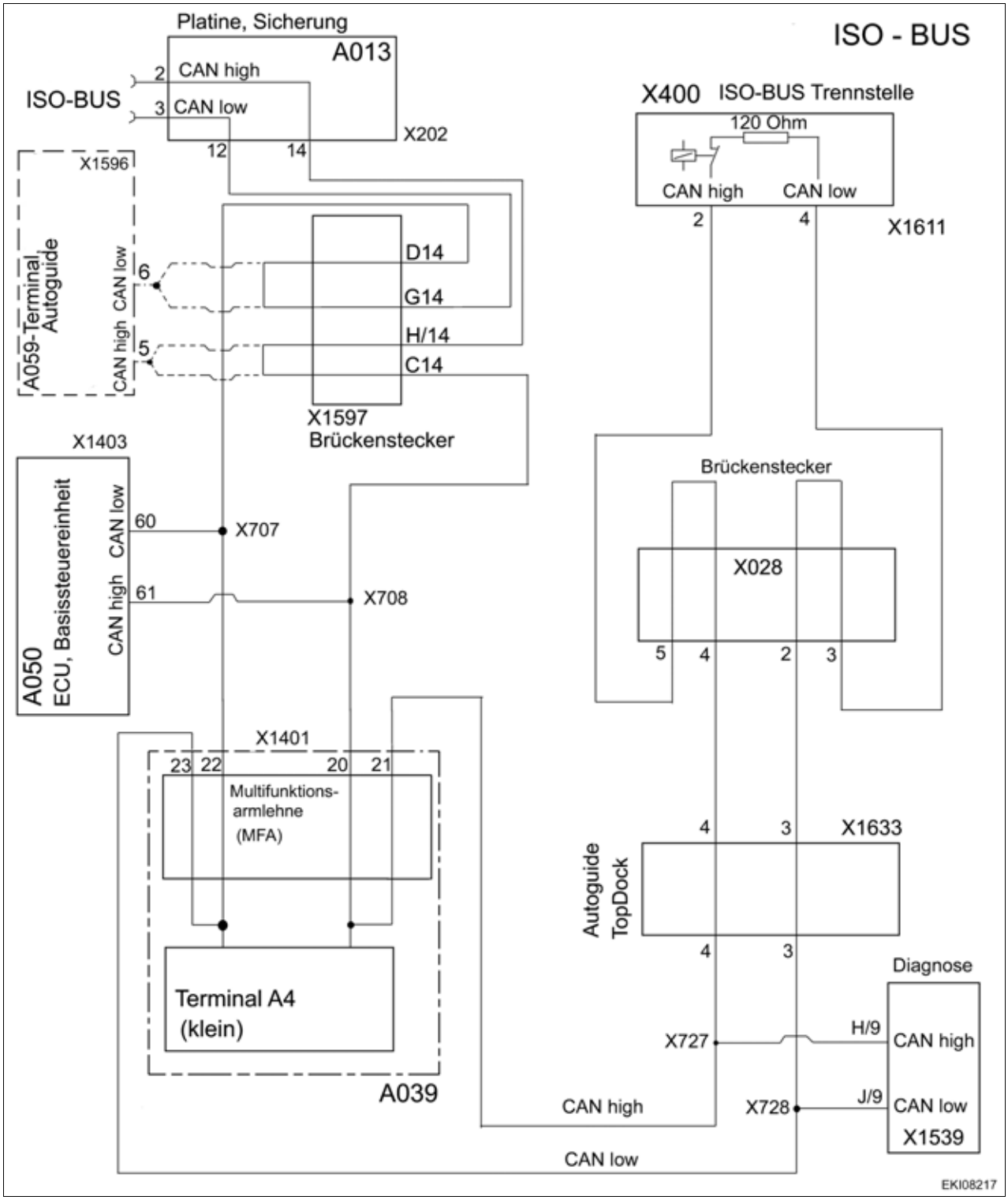


Fig. 62. ISO bus

I001189

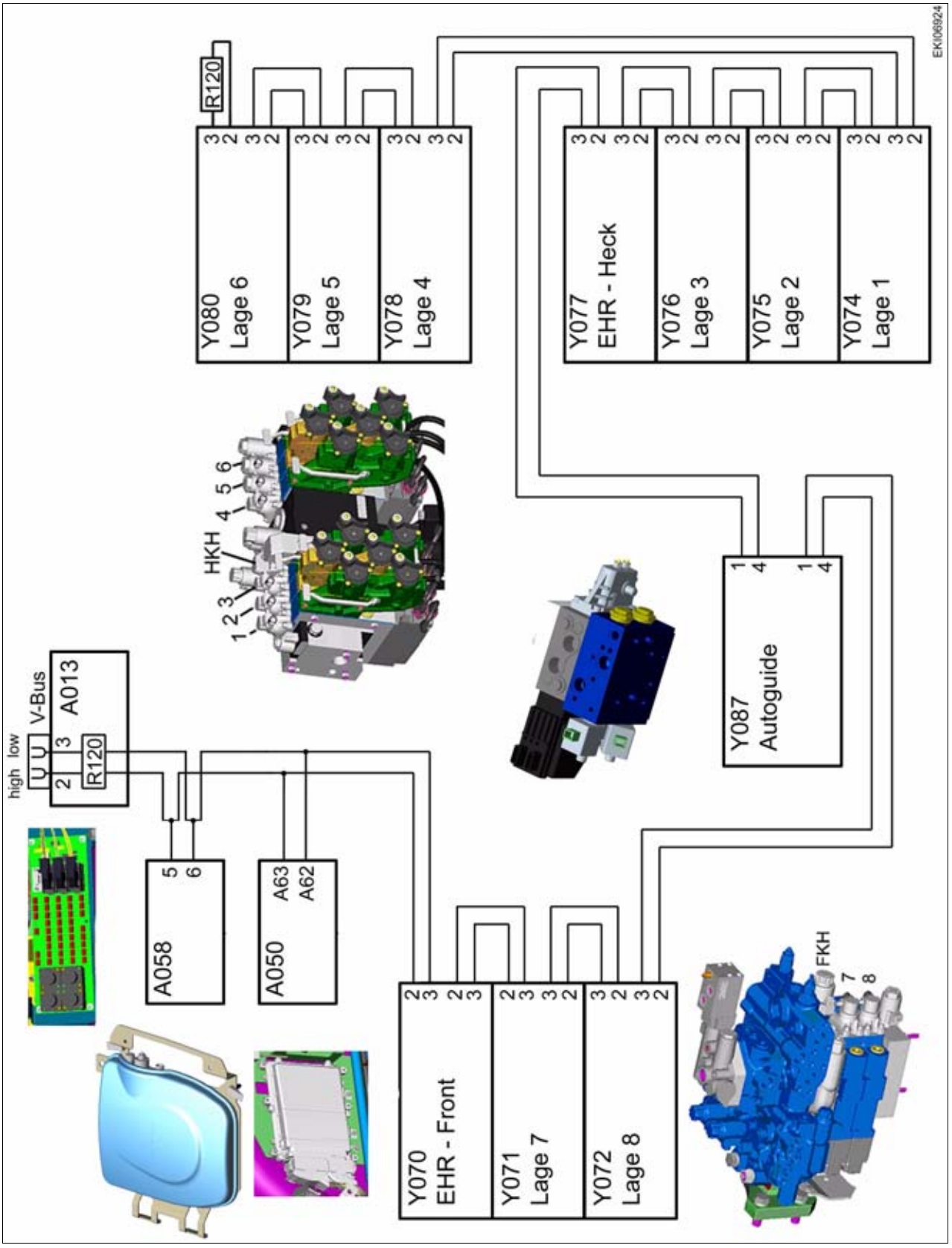


Fig. 63. Valve bus I004837

Measuring and testing CAN bus

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.201 adapter cable to the **A050** - ECU, basic control unit and measure the pins (see table).* *see §34*



Prerequisite for this measurement:

– Ignition off
– Following measurements at separation point **X1402 [B]** - Separation point on A050

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
Control bus: version A (to 9../../1700)					
15 (X1402)	Control bus_High (Control bus)	Ignition OFF	**approx. 40 ohms (3x 120 ohms parallel)** Terminating resistance: **A007** - Instrument panel (120 ohms) **A013** - PCB, microfuses (120 ohms) **A038** - ECU, central electrical system (120 ohms)		
16	Control bus_Low (Control bus)				
Control bus: version B (from 9../../1701)					
15 (X1402)	Control bus_High (Control bus)	Ignition OFF	**approx. 60 ohms (2x 120 ohms parallel)** Terminating resistance: **A007** - Instrument panel (120 ohms) **A013** - PCB, microfuses (120 ohms)		
16 (X1402)	Control bus_Low (Control bus)				
53 (X1402)	Transmission bus_High (Transmission bus)	Ignition OFF	**approx. 60 ohms (2x 120 ohms parallel)** Terminating resistance: **A009** - Actuator unit (120 ohms) **A013** - PCB, microfuses (120 ohms)		
54 (X1402)	Transmission bus_Low (Transmission bus)				



Prerequisite for this measurement:

– Ignition off
– Following measurements at **X1403 [A]** - Separation point on A050

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
60 (X1403)	ISO bus_Low	Ignition OFF, no implement attached	**approx. 120 ohms** Terminating resistance: **X400** - Rear ISO implement socket (120 ohms) Note: if an implement is attached, the resistor in the X400 socket switches off and only the terminating resistance of the implement remains.		
61 (X1403)	ISO bus_High				
62 (X1403)	Valve bus_Low Valve bus	Ignition OFF	**approx. 60 ohms (2x 120 ohms parallel)** Terminating resistances: - **A013** - PCB, microfuses (120 ohms) - **X1491** - Rear V bus terminal (120 Ω)		
63 (X1403)	V bus_High Valve bus				

21 A050 hydraulics protection and supply (working and steering hydraulics)

Circuit diagram: hydraulics protection and supply (working and steering hydraulics) Part 1

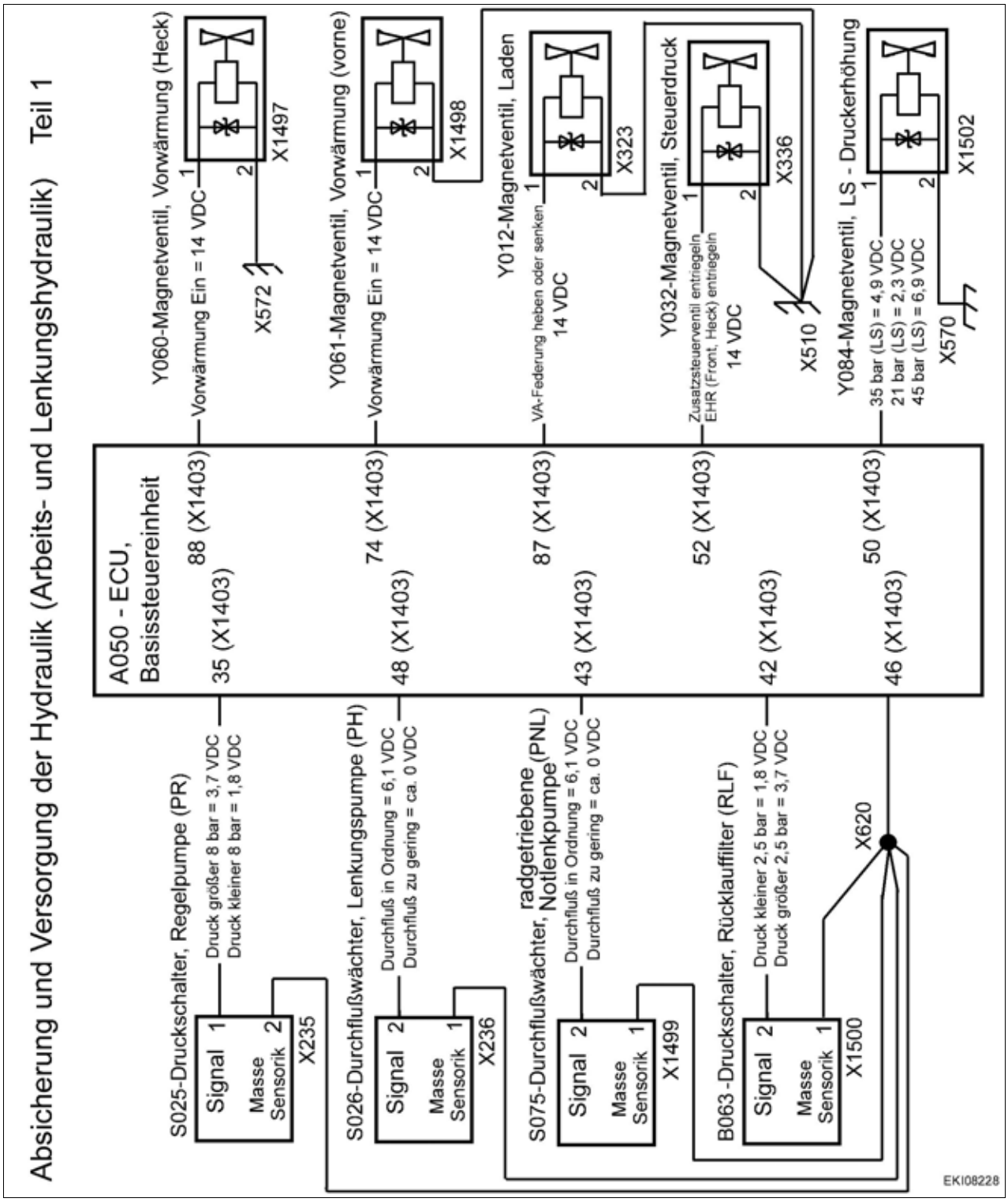


Fig. 64. I001882

Circuit diagram: hydraulics protection and supply (working and steering hydraulics) Part 2

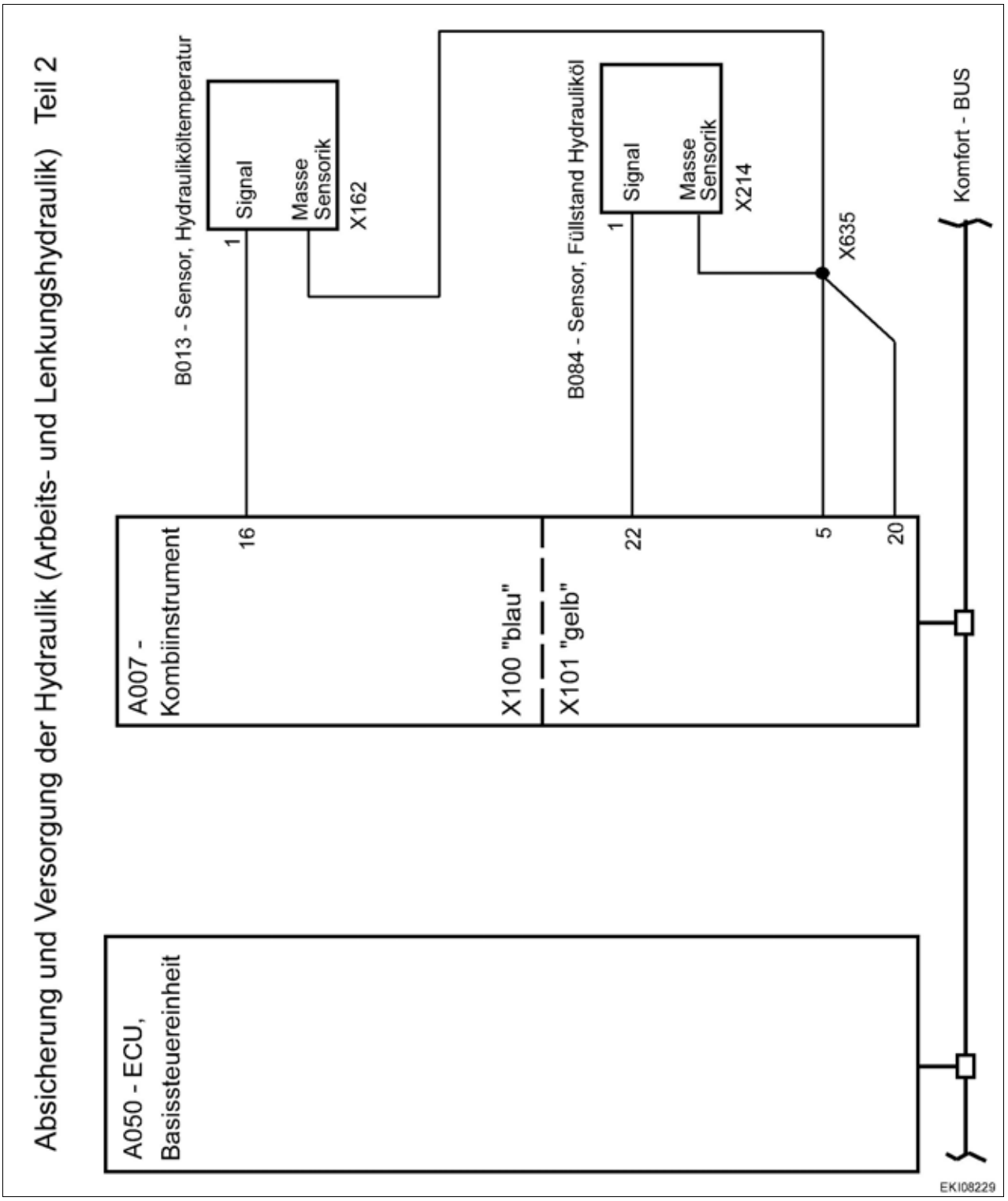


Fig. 65. I001883

Pin assignment and signal values

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.201 adapter cable to the **A050** - ECU, basic control unit and measure the pins (see table).* *see §34*

Prerequisite for this measurement:

– Measure **earth** on pin **46** (**X1403 [A]** - Separation point on A050)
– Measure following pins on **X1403 [A]** - Separation point on A050

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
B063 - Pressure switch, filter contamination (hydraulic circuit) (DSF) (**Earth** pin **46**)					
42 (X1403)	Monitoring return pressure				
(digital input)		Return pressure below 2.5 bar (return pressure OK)	1.8 VDC	6.1 VDC	0 VDC
		Return pressure over 2.5 bar (return pressure too high, e.g. if filter clogged)	3.7 VDC		
S025 - Switch, LS pump pressure monitor(DS1) (**Earth** pin **46**)					
35 (X1403)	Monitoring pressure at LS pump (PR) **NOTE:** *The pressure is monitored from 1000 rpm only*				
(digital input)		Pressure at LS pump min. 8 bar (LS pump OK)	3.7 VDC	6.1 VDC	0 VDC
		Pressure at LS pump below 8 bar (pressure at LS pump too low)	1.8 VDC		
S026 - Switch, steering pump flow controller (DFWH) (**Earth** pin **46**)					
48 (X1403)	Monitoring oil flow at the steering pump (PH)				
(digital input)	**Note:** The flow volume at the steering pump (PH) is monitored from: – 1000 engine revolutions	Flow volume OK	6.1 VDC (S026 open)	6.1 VDC	0 VDC
		Flow volume too low	0 VDC (S026 closed)		
S075 - Switch, guard rail pump flow monitor (DFWN) (**Earth** pin **46**)					

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
43 (X1403)	Monitoring of oil flow to the wheel-driven emergency steering pump (PNL)				
(digital input)	**Note:** The flow volume at the guard rail pump (PNL) is monitored: – During forward travel - from a speed faster than 16 Km/h	Flow volume OK	6.1 VDC (S075 open)	6.1 VDC	0 VDC
		Flow volume too low	0 VDC (S075 closed)		

Prerequisite for this measurement:

– Measure **earth** on pin **22** (**X1403 [A]** - Separation point on A050)

– Measure following pins on **X1403 [A]** - Separation point on A050

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
Y012 - Oil pre-heater/load suspension solenoid valve (MVL) (**Earth** pin **22**)					
87 (X1403)	When: – The front axle suspension (raising or lowering) – The oil preheater is activated, the LS pump (PR) moves the **Y012** - Oil pre-heater/load suspension solenoid valve.				
(digital output)		**Y012** - Oil pre-heater/load suspension solenoid valve not active	0 VDC	0 VDC	0 VDC
		Y012 - Oil pre-heater/load suspension solenoid valve active (raise or lower front axle suspension)	14 VDC	Approx. 12 VDC test voltage. The voltage level is not loadable.	0 VDC

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
		Using multimeter (ampere meter), open and measure pin 87. **Y012** - Oil pre-heater/load suspension solenoid valve active (raise or lower front axle suspension)	Approx. 1.7 ADC	-	-
Y032 - Control pressure solenoid valve (MVP) (**Earth** pin **22**)					
52 (X1403)	The **Y032** - Control pressure solenoid valve generates the control pressure (22 bar) for activating: - The electrical Auxiliary control valves – The EHR cut-off valve – front – The EHR cut-off valve – rear				
(digital output)		**Y032** - Control pressure solenoid valve not active	0 VDC	0 VDC	0 VDC
		Y032 - Control pressure solenoid valve active (unlock electrical auxiliary control valves or unlock front power lift cut-off valve or unlock EPC rear cut-off valve)	14 VDC	Approx. 12 VDC test voltage. The voltage level is not loadable.	0 VDC
		Using multimeter (ampere meter), open and measure pin 52.	approx. 1.2 ADC	-	-
Y060 - Hydraulic oil pre-heater solenoid valve (rear) (MVVH) (**Earth** pin **22**)					
88 (X1403)	Heats up the hydraulic oil (pre-heater activated when oil temperature drops below 0 °C)				

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
(digital output)	**Note:** **The B013 - Sensor, hydraulic oil temperature indicates the hydraulic oil temperature** At approx. 5.9 Kohms (0°C) –> hydraulic oil pre-heater switches on At approx. 1.6 ohms (32°C) –> hydraulic oil pre-heater switches off When the hydraulic oil pre-heater is switched on: -**Y012** - Oil pre-heater/load suspension solenoid valve active -**Y060** - Hydraulic oil pre-heater solenoid valve (rear) active -**Y061** - hydraulic oil pre-heater solenoid valve (middle) active	**Y060** - Hydraulic oil pre-heater solenoid valve (rear) not active	0 VDC	0 VDC	0 VDC
		Y060 - Hydraulic oil pre-heater solenoid valve (rear) active	14 VDC	Approx. 12 VDC test voltage. The voltage level is not loadable.	0 VDC
		Using multimeter (ampere meter), open and measure pin 88. **Y060** - Hydraulic oil pre-heater solenoid valve (rear) active	Approx. 1.5 ADC	-	-
Y061 - hydraulic oil pre-heater solenoid valve (middle) (**Earth** pin **46**)					
74 (X1403)	Heats up the hydraulic oil (pre-heater activated when oil temperature drops below 0 °C)				
(digital output)	**Note:** – The B013 sensor indicates the hydraulic oil temperature At approx. 5.9 Kohms (0°C) –> hydraulic pre-heater switches on At approx. 1.6 ohms (32 °C) –> hydraulic pre-heater switches off When the hydraulic oil pre-heater is switched on: -**Y012** - Oil pre-heater/load suspension solenoid valve active -**Y060** - Hydraulic oil pre-heater solenoid valve (rear) active -**Y061** - hydraulic oil pre-heater solenoid valve (middle) active	**Y061** - hydraulic oil pre-heater solenoid valve (middle) not active	0 VDC	0 VDC	0 VDC

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
		Y061 - hydraulic oil pre-heater solenoid valve (middle) active	14 VDC	Approx. 12 VDC test voltage. The voltage level is not loadable.	0 VDC
		Using multimeter (ampere meter), open and measure pin 74. Y061 solenoid valve active	Approx. 1.5 ADC	-	-
Y084 - Solenoid valve, Power Beyond (DRVE) (**Earth** pin **22**)					
50 (X1403)					
(PWM – output)	The hydraulic control pressure (load sensing pressure) for an external pressure connection (Power Beyond) can be set from 1–25 bar via the Vario terminal.				
		Default setting =15 bar	4.9 VDC	approx. 11 VDC test voltage The voltage level is not loadable.	0 VDC
		Using multimeter (ampere meter), open and measure pin 50.	approx. 0.8 ADC	-	-
		Min. =21 bar	2.3 VDC	approx. 11 VDC test voltage The voltage level is not loadable.	0 VDC
		Using multimeter (ampere meter), open and measure pin 50.	approx. 0.4 ADC	-	-
		Max. =45 bar	6.9 VDC	approx. 11 VDC test voltage The voltage level is not loadable.	0 VDC
		Using multimeter (ampere meter), open and measure pin 50.	approx. 1.1 ADC	-	-

NOTE: *see §19*
Chapter 9000 Reg. C – Electrical circuit diagrams.
Chapter 9600 Reg. C – Hydraulic circuit diagrams (working and steering hydraulics).

22 A050 rear power lift EPC and rear power lift additional functions

Circuit diagram: EHR rear power lift (single-acting "SA")

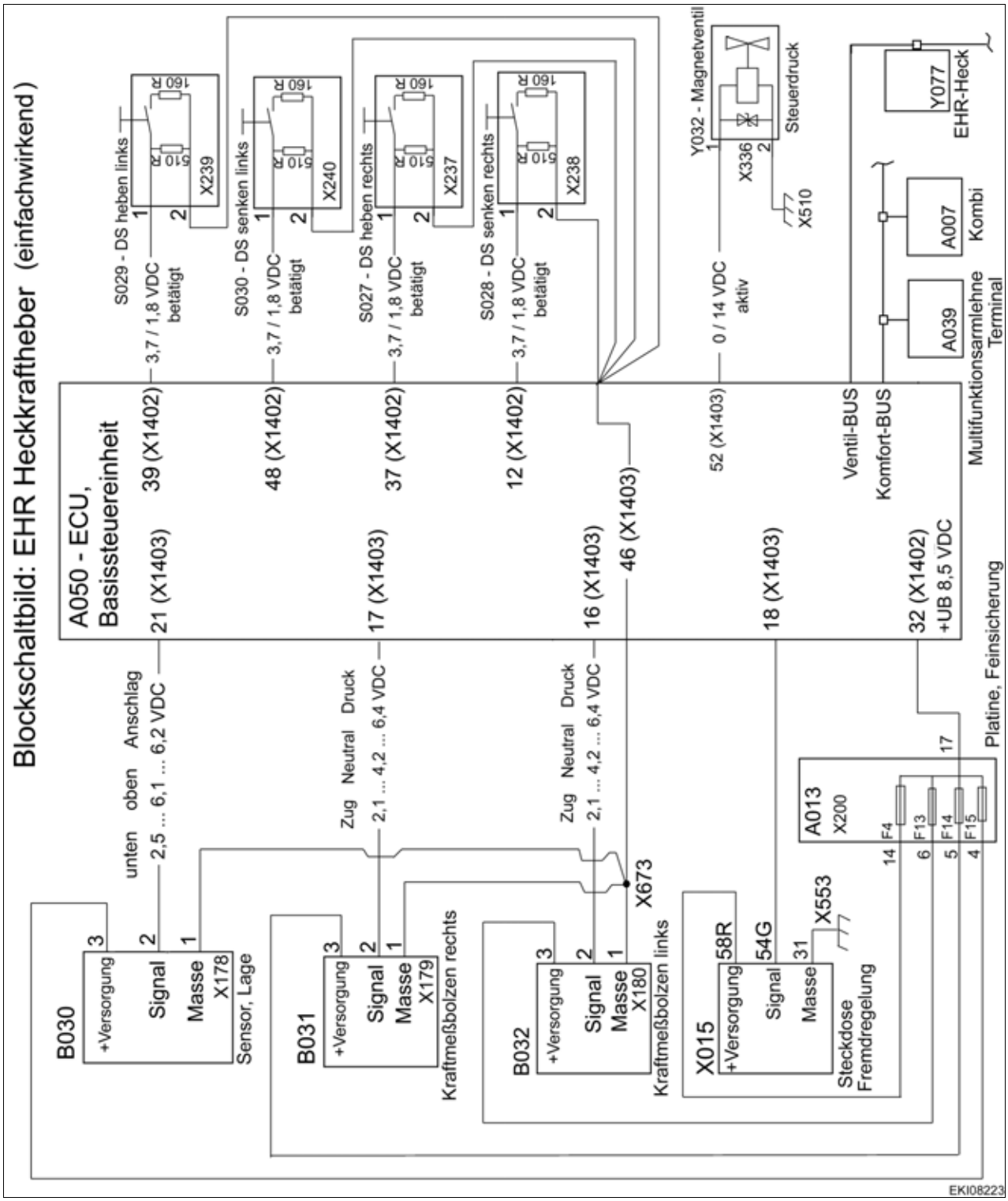


Fig. 66. I001887

Circuit diagram: EHR rear power lift (single-acting "SA", double-acting "DA")

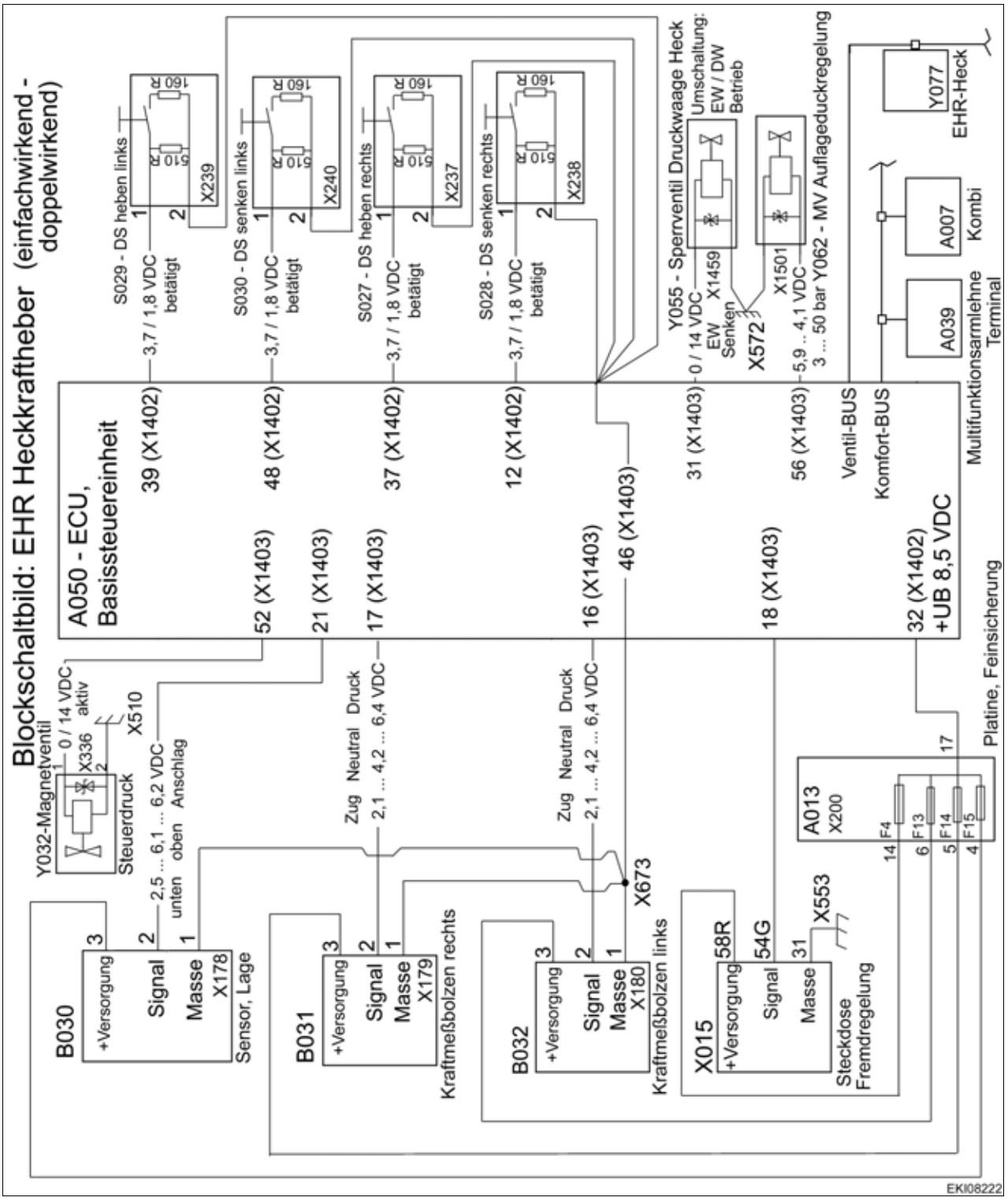


Fig. 67. I001886

Pin assignment and signal values on the **A050** - ECU, basic control unit

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.201 adapter cable to the **A050** - ECU, basic control unit and measure the pins (see table).*



Prerequisite for this measurement:

– Measure sensor system **earth** at pin **46 X1403 [A]** - Separation point on A050
– Measure electronics **earth** at pin **22 X1403 [A]** - Separation point on A050

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
B030 - Sensor, rear power lift position (**Earth** pin **46**)					
32 (X1402)	**+ supply** for **B030** - Sensor, rear power lift position Ignition ON.	+ UB stabiliser 8.5 VDC	9.0 VDC	9.0 VDC	0 VDC
21 (X1403)	**Signal**, Start engine, Unlock EPC on quick lift switch				
	Error thresholds: Signal below 1.6 VDC = F.C. 08.1.22. Signal above 6.8 VDC = F.C. 08.1.22.	Set tractive power control position to 100%, Set lift height limiter to maximum, Switch quick lift switch to lower ("control")			
		Depth control in Pos. 10 (floating position)	2.5 VDC	0 VDC	2.5 VDC
		Depth control in Pos. 0 (transport lock)	6.1 VDC	0 VDC	6.1 VDC
		With S027/S029 – external lift switch, move the rear power lift against the upper mechanical stop (overrun approx. 10 mm).	6.2 VDC	0 VDC	6.2 VDC
B031 - Sensor, draft sensing pin, right (**Earth** pin **46**)					
32 (X1402)	**+ supply** for **B031** - Sensor, draft sensing pin, right Ignition ON.	+ UB stabiliser 8.5 VDC	8.5 VDC	8.5 VDC	0 VDC
17 (X1403)	**Signal** Ignition ON. Load draught sensing pin with mounting lever **Overload threshold:** Signal below 2.07 VDC = F.C. 08.1.33. Signal above 6.40 VDC = F.C. 08.1.33. **Error threshold:** 0 VDC or short-circuit to earth = F.C. 08.1.31. Overload or short-circuit to + = F.C. 08.1.33.				
		Max. tractive effort	2.07 VDC	0 VDC	2.07 VDC
		Neutral	4.22 VDC	0 VDC	4.22 VDC
		Max. pressure force	6.40 VDC	0 VDC	6.40 VDC

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
B032 - Sensor, draft sensing pin, left (**Earth** pin **46**)					
32 (X1402)	**+ supply** for **B032** - Sensor, draft sensing pin, left Ignition	+ UB stabiliser 8.5 VDC	8.5 VDC	8.5 VDC	0 VDC
16 (X1403)	**Signal** Ignition ON. Load draught sensing pin with mounting lever **Overload threshold:** Signal below 2.07 VDC = F.C. 08.1.34. Signal above 6.40 VDC = F.C. 08.1.34. **Error threshold:** 0 VDC or short-circuit to earth = F.C. 08.1.32. Overload or short-circuit to + = F.C. 08.1.34.				
		Max. tractive effort	2.07 VDC	0 VDC	2.07 VDC
		Neutral	4.22 VDC	0 VDC	4.22 VDC
		Max. pressure force	6.40 VDC	0 VDC	6.40 VDC
S027 - Button, rear power lift, right-hand external raise (**Earth** pin **46**)					
37 (X1402)	**Signal** Ignition ON.				
(digital input)		**S027** - Button, rear power lift, right-hand external raise not actuated	3.7 VDC	6.1 VDC	0 VDC
		S027 - Button, rear power lift, right-hand external raise actuated	1.8 VDC		
S028 - Button, rear power lift, right-hand external lower (**Earth** pin **46**)					
12 (X1402)	**Signal** Ignition ON.				
(digital input)		**S028** - Button, rear power lift, right-hand external lower not actuated	3.7 VDC	6.1 VDC	0 VDC
		S028 - Button, rear power lift, right-hand external lower actuated	1.8 VDC		
S029 - Button, rear power lift, left-hand external raise **(Earth** pin **46**)					
39 (X1402)	**Signal** Ignition ON.				
(digital input)		**S029** - Button, rear power lift, left-hand external raise not actuated	3.7 VDC	6.1 VDC	0 VDC

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
		S029 - Button, rear power lift, left-hand external raise actuated	1.8 VDC		
S030 - Button, rear power lift, left-hand external lower (**Earth** pin **46**)					
48 (X1402)	**Signal** Ignition ON.				
(digital input)		**S030** - Button, rear power lift, left-hand external lower not actuated	3.7 VDC	6.1 VDC	0 VDC
		S030 - Button, rear power lift, left-hand external lower actuated	1.8 VDC		
X015 - External control socket (Operating: Fitting an external position sensor)					
18 (X1403)	**Signal** Ignition ON. Engine is running				
	For checking external position sensor: **Connect external position sensor to the X015 - External control socket.** If the sensor is electrically connected to the EPC system via the **X015** - External control socket, the control switches on automatically. Set position – tractive power – mix control switch to approx. 50% position and 50% tractive power. Activate sensor plunger. Rear power lift must "raise" and "lower" **Error threshold:** Signal above 6.8 VDC = F.C. 08.1.24. Signal below 2.07 VDC = no error.				
		Press plunger in (voltage reduces) --> rear power lift rises	6.8 ... 2.07 VDC	0 VDC	6.8 ... 2.07 VDC
		Release plunger (voltage rises) --> Rear power lift is lowered.	2.07 ... 6.8 VDC	0 VDC	2.07 ... 6.8 VDC
Y032 - Control pressure solenoid valve(MVP) (**Earth** pin **22**)					
52 (X1403)	**Signal** Ignition ON. Engine is running				

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
(PWM signal)	The **Y032** - Control pressure solenoid valve generates the control pressure (22 bar) for activating: - The electrical Auxiliary control valves – The front EPC cut-off valve – The rear EPC cut-off valve	**Y032** - Control pressure solenoid valve not active	0 VDC	0 VDC	0 VDC
		Y032 - Control pressure solenoid valve active (unlock rear EHR cut-off valve)	14 VDC	Approx. 12 VDC test voltage. The voltage level is not loadable.	0 VDC
		Using multimeter (ampere meter), open and measure pin 52.	approx. 1.2 ADC	-	-
Y055 - Rear pressure compensator lock valve (MVKH) (**Earth** pin **22**)					
31 (X1403)	**Signal** Ignition ON. Engine is running Unlock EPC on quick lift switch				
(PWM signal)	If required, the rear power lift can be switched from SA (single-acting) to DA (double-acting) **on the Vario terminal**.				
		Rear power lift in SA mode (single-acting)			
	Conditions: – Hydraulic oil temperature = 40 °C to 50 °C – Carry out test using installed implement	rear power lift rises	0 VDC	approx. 11 VDC test voltage The voltage level is not loadable.	0 VDC
		Rear power lift is lowered.	14 VDC		
	When lowering in SA mode: If the **A050** - ECU, basic control unit detects that the rear power lift is no longer lowering (no signal change at the B030 position sensor) before the working depth (depth regulation) has been reached, the EPC cut-off valve switches to the floating position (no current at the **Y055** - Rear pressure compensator lock valve)	Using multimeter (ampere meter), open and measure pin 31. Rear power lift is lowered.	1.6 ADC	-	-
		Rear power lift in DA (double-acting) mode			

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
		rear power lift rises	0 VDC	approx. 11 VDC test voltage The voltage level is not loadable.	0 VDC
		Rear power lift is lowered.	0 VDC		
Y062 - Solenoid valve, field pressure control (rear) (**Earth** pin **22**)					
56 (X1403)	**Signal** Ignition ON. Engine is running Unlock EPC on quick lift switch				
(PWM signal)	**T**he rear power lift field pressure can be set on the Vario terminal.				
		Field pressure:3 bar	5.9 VDC	approx. 11 VDC test voltage The voltage level is not loadable.	0 VDC
		Using multimeter (ampere meter), open and measure pin 56.	1.1 ADC	-	-
		Field pressure:15 bar	4.8 VDC	approx. 11 VDC test voltage The voltage level is not loadable.	0 VDC
		Using multimeter (ampere meter), open and measure pin 56.	0.9 ADC	-	-
		Field pressure:30 bar	4.5 VDC	approx. 11 VDC test voltage The voltage level is not loadable.	0 VDC
		Using multimeter (ampere meter), open and measure pin 56.	0.88 ADC	-	-

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
		Field pressure:50 bar	4.1 VDC	approx. 11 VDC test voltage The voltage level is not loadable.	0 VDC
		Using multimeter (ampere meter), open and measure pin 56.	0.8 ADC	-	-

Circuit diagram: rear power lift, additional functions

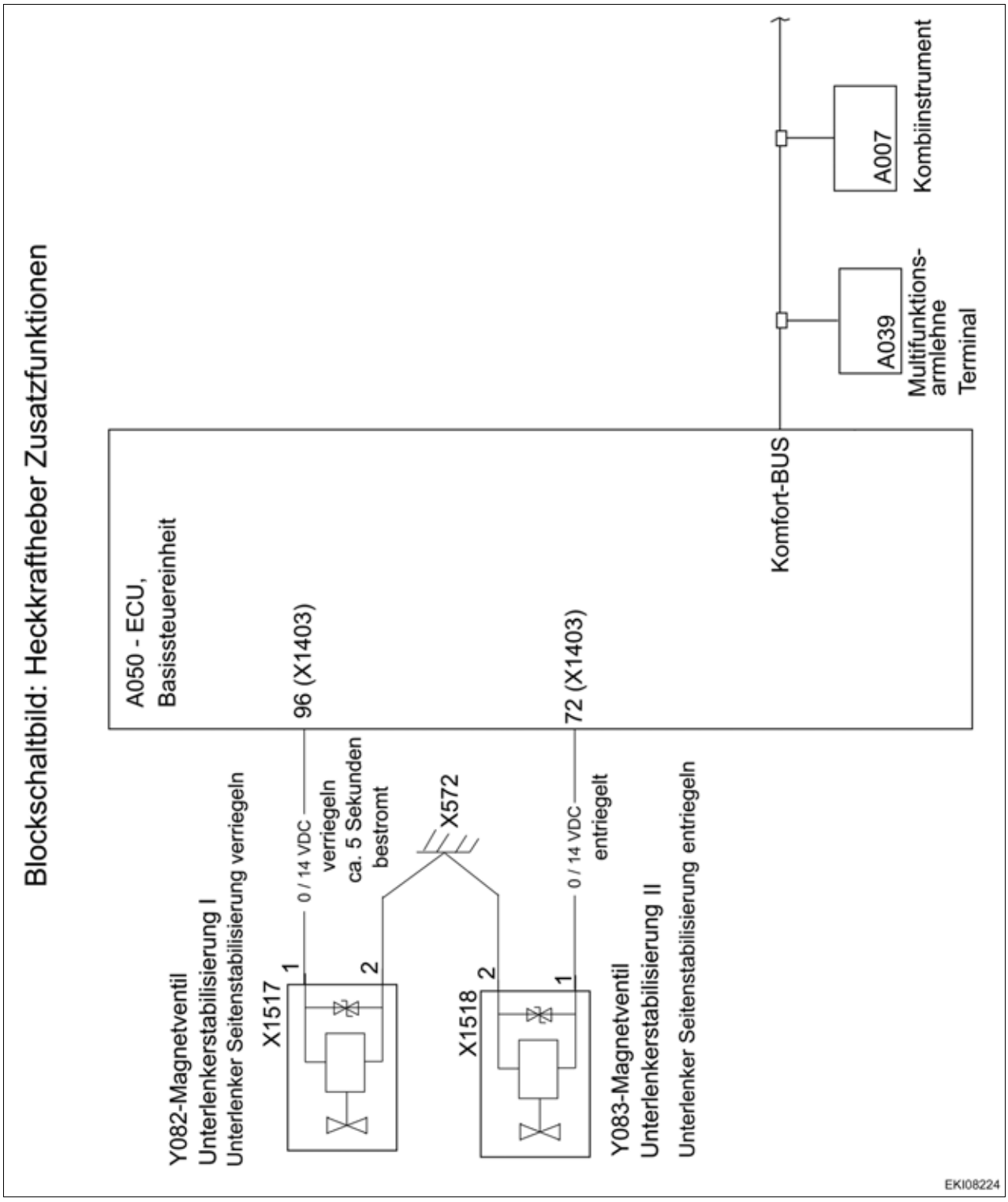


Fig. 68. I001888

Lower link lateral stabiliser

Prerequisite for this measurement:

– Measure electronics **earth** at pin **22 X1403 [A]** - Separation point on A050

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
Y082 - Solenoid valve, lower link stabiliser, lock (MVUL) "Lock" (**Earth** pin **22**)					
96 (X1403)	Start engine.				
(digital output)		Unlock lower link lateral stabiliser	0 VDC	Approx. 12 VDC test voltage. The voltage level is not loadable.	0 VDC
		Lock lower link lateral stabiliser The **Y082** - Solenoid valve, lower link stabiliser, lock is energised for approx. 5 seconds	14 VDC		
		Using multimeter (ampere meter), open and measure pin 96. Lock lower link lateral stabiliser The **Y082** - Solenoid valve, lower link stabiliser, lock is energised for approx. 5 seconds	1.7 ADC	-	-
Y083 - Solenoid valve, lower link stabiliser, release (SVUL) "Unlock" (**Earth** pin **22**)					
72 (X1403)	Start engine.				
(digital output)		Lower link lateral stabiliser locked	0 VDC	Approx. 12 VDC test voltage. The voltage level is not loadable.	0 VDC
		Lower link lateral stabiliser unlocked	14 VDC		
		Using multimeter (ampere meter), open and measure pin 72. Lower link lateral stabiliser unlocked	1.6 ADC	-	-

NOTE: *see §19*
see §20

23 A050 electr. auxiliary control valves Bosch SB23 EHS 2

Circuit diagram: valve bus (V-BUS)

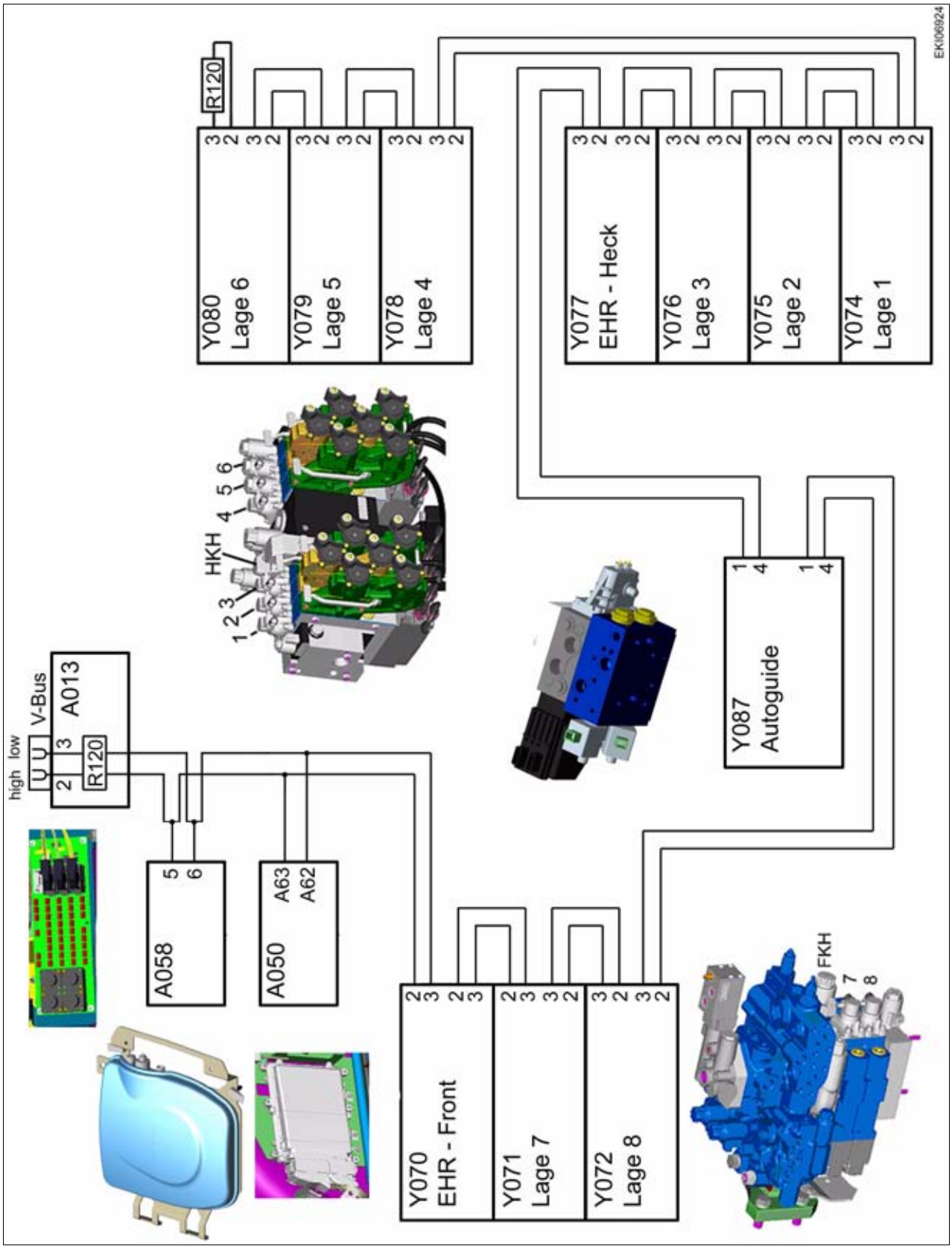


Fig. 69. I004837

Circuit diagram: electr. auxiliary control valves Bosch SB23 EHS 2

Fig. 70. I002001

Pin assignment and signal values on the **A050** - ECU, basic control unit

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.201 adapter cable to the **A050** - ECU, basic control unit and measure the pins (see table).* *see §34*

Prerequisite for this measurement:

– **Earth** Measure **sensors** at pin **46 X1403 [A]** - Separation point on A050
– Measure **electronics earth** at pin **22 X1403 [A]** - Separation point on A050

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
S067 - Button, valve actuation, external raise (**Earth** pin **46**)					
35 (X1402)	**Signal** Ignition ON.				
(digital input)		**S067** - Button, valve actuation, external raise not actuated	3.7 VDC	6.1 VDC	0 VDC
		S067 - Button, valve actuation, external raise actuated	1.8 VDC		
S068 - Button, valve actuation, external lower (**Earth** pin **46**)					
47 (X1402)	**Signal** Ignition ON.				
(digital input)		**S068** - Button, valve actuation, external lower not actuated	3.7 VDC	6.1 VDC	0 VDC
		S068 - Button, valve actuation, external lower actuated	1.8 VDC		
Y032 - Control pressure solenoid valve (**Earth** pin **22**)					
52 (X1403)	**Signal** Ignition ON. Engine is running				
(PWM sig-nal)	The **Y032** - Control pressure solenoid valve generates the control pressure (22 bar) for activating: - The electrical Auxiliary control valves – The front EPC cut-off valve – The rear EPC cut-off valve	EPC front, EPC rear, electr. aux-iliary control valves locked	0 VDC	Approx. 12 VDC test voltage. The voltage level is not loadable.	0 VDC
		EPC front or EPC rear or electr. auxiliary control valves locked	14 VDC		
		Using multimeter (ampere meter), open and measure pin 52. Unlock EHR front or EHR rear, or electr. auxiliary control valves	approx. 1.2 ADC	-	-

NOTE: *see §19*
see §20

24 A050 standard front power lift

Circuit diagram: Standard front power lift

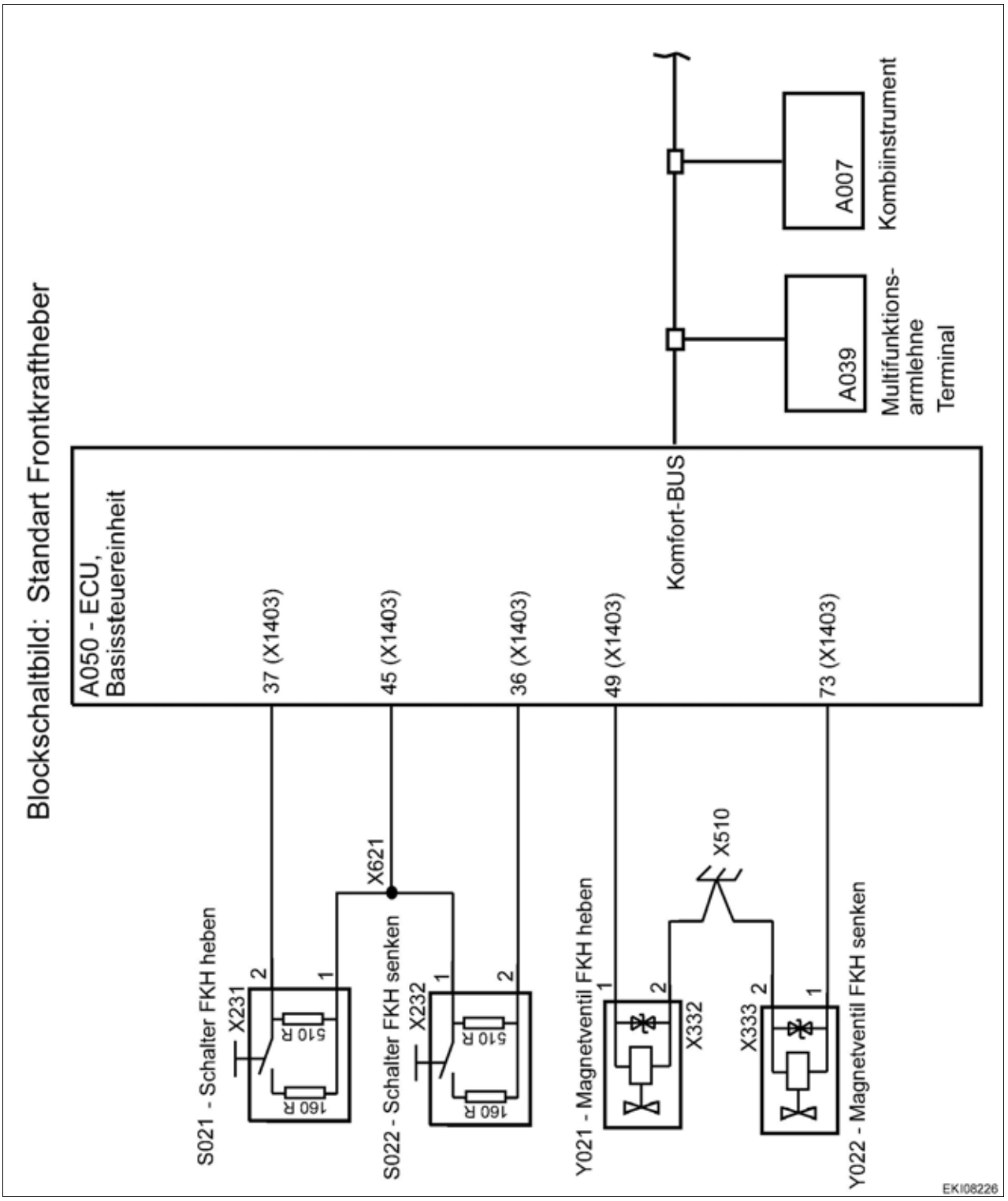


Fig. 71. I002746

Pin assignment and signal values on the **A050** - ECU, basic control unit

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.201 adapter cable to the **A050** - ECU, basic control unit and measure the pins (see table).* *see §34*

Prerequisite for this measurement:

– Measure electronics **earth** at pin **22 X1403 [A]** - Separation point on A050

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
S021 - Button, front power lift, external raise (**Earth** pin **22**)					
37 (X1403)	**Signal** Ignition ON.			6.1 VDC	0 VDC
		S021 - Button, front power lift, external raise not actuated	3.7 VDC		
		S021 - Button, front power lift, external raise actuated	1.8 VDC		
S022 - Button, front power lift, external lower (**Earth** pin **22**)					
36 (X1403)	**Signal** Ignition ON.			6.1 VDC	0 VDC
		S022 - Button, front power lift, external lower not actuated	3.7 VDC		
		S022 - Button, front power lift, external lower actuated	1.8 VDC		
Y021 - Lifting solenoid valve (standard front power lift) (Coil resistance: 5 ohms) (**Earth** pin **22**)					
49 (X1403)	**Actuation** Ignition ON. Engine is running			approx. 11 VDC test voltage The voltage level is not loadable.	0 VDC
		Front power lift not activated	0 VDC		
		Front power lift is raised	14 VDC		
Y022 - Lowering solenoid valve (standard front power lift) (Coil resistance: 5 ohms) (**Earth** pin **22**)					
73 (X1403)	**Actuation** Ignition ON. Engine is running			approx. 11 VDC test voltage The voltage level is not loadable.	0 VDC
		Front power lift not activated	0 VDC		
		Front power lift is lowered	14 VDC		

NOTE: *see §19*

25 A050 front power lift enhanced control

Circuit diagram: enhanced front power lift (EPC, front)

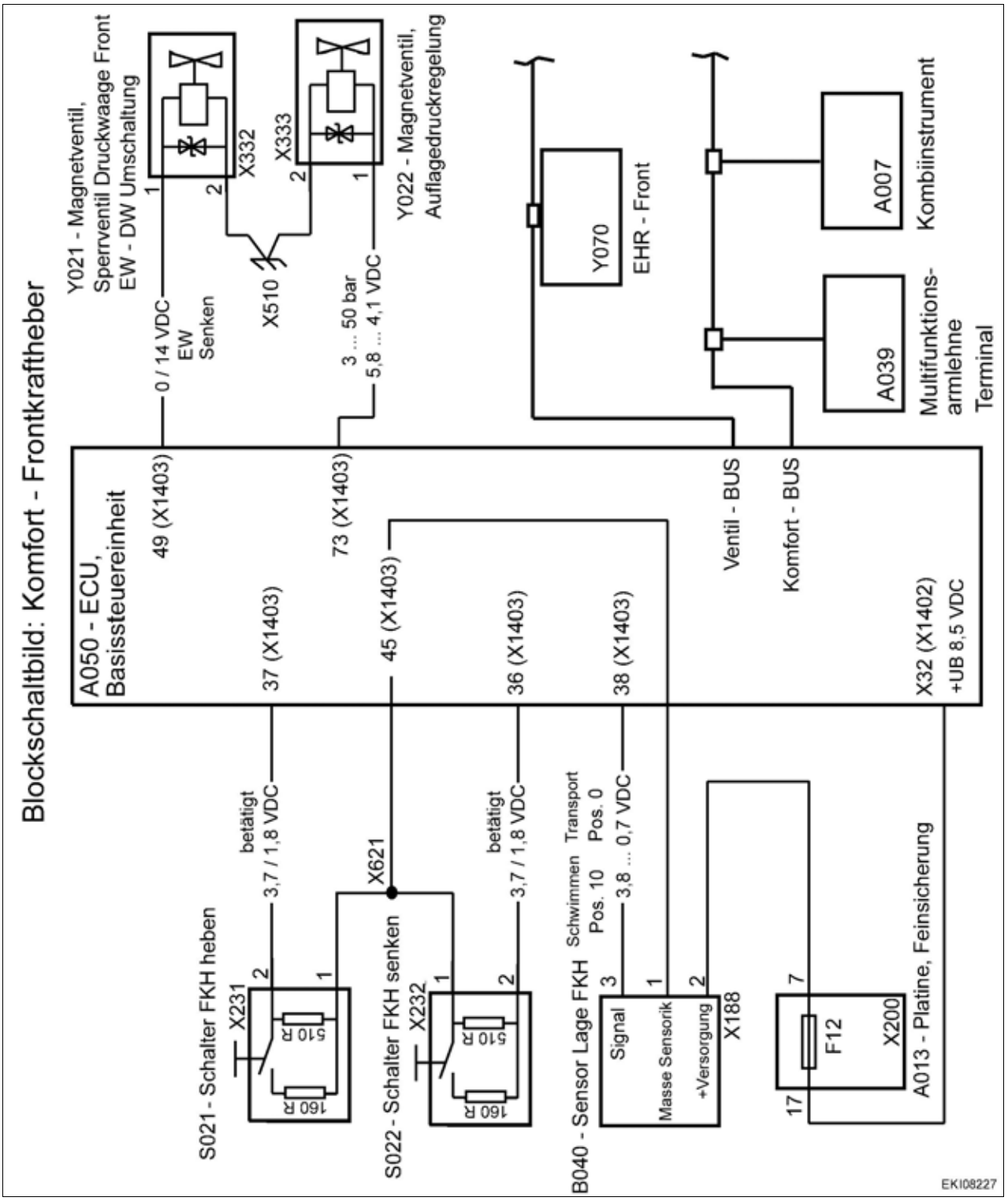


Fig. 72. I001895

Pin assignment and signal values on the **A050** - ECU, basic control unit

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.201 adapter cable to the **A050** - ECU, basic control unit and measure the pins (see table).* *see §34*

Prerequisite for this measurement:

– Measure sensor system **earth** at pin **45 X1403 [A]** - Separation point on A050
– Measure electronics **earth** at pin **22 X1403 [A]** - Separation point on A050

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
B040 - Sensor, front power lift position (**Earth** pin **45**)					
32 (X1402)	**+ supply** Ignition ON.				
		+UB 8.5 VDC	8.5 VDC	8.5 VDC	0 VDC
38 (X1403)	**Signal** Ignition ON. Engine is running Unlock EPC on quick lift switch			0 VDC	6.7 VDC
	Set lift height limiter to maximum Set quick lift switch to control (lower)	Depth control to Pos. 10 (floating position)	3.8 VDC 18 mADC		
		Depth control to Pos. 0 (transport position)	0.7 VDC 3.5 mADC		
S021 - Button, front power lift, external raise (**Earth** pin **45**)					
37 (X1403)	**Signal** Ignition ON.			6.1 VDC	0 VDC
(digital input)		**S021** - Button, front power lift, external raise not actuated	3.7 VDC		
		S021 - Button, front power lift, external raise actuated	1.8 VDC		
S022 - Button, front power lift, external lower (**Earth** pin **45**)					
36 (X1403)	**Signal** Ignition ON.			6.1 VDC	0 VDC
(digital input)		**S022** - Button, front power lift, external lower not actuated	3.7 VDC		
		S022 - Button, front power lift, external lower actuated	1.8 VDC		
Y021 - Front pressure compensator lock valve (**Earth** pin **22**)					
49 (X1403)	**Signal** Ignition ON. Engine is running Unlock EPC on quick lift switch				

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
(PWM signal)	In the Vario terminal, the enhanced control front power lift can be switched from single-acting (SA) to double-acting (DA)				
	Conditions: – Hydraulic oil temperature 40 °C to 50C° – Carry out test using installed implement	**Front power lift in SA mode (single-acting)** Front power lift is raised	0 VDC	approx. 11 VDC test voltage The voltage level is not loadable.	0 VDC
	When lowering in SA mode: If the basic control unit A050 ECU detects that the front power lift is no longer lowering (no signal change at the B040 position sensor) before the working depth (depth regulation) has been reached, the EHR cut-off valve switches to the floating position (no current at the Y021 solenoid valve).	Front power lift is lowered	14 VDC		
		Using multimeter (ampere meter), open and measure pin 49. Front power lift is lowered	1.5 ADC	-	-
		Front power lift in DA mode (double-acting) Front power lift is raised	0 VDC	approx. 11 VDC test voltage The voltage level is not loadable.	0 VDC
		Front power lift is lowered	0 VDC		
Y022 - Field pressure control solenoid valve (front), (**Earth** pin **22**)					
73 (X1403)	**Signal** Ignition ON. Engine is running Unlock EPC on quick lift switch				
(PWM signal)	In the Vario terminal, the field pressure of the front power lift in double-acting (DA) mode can be set				
		Field pressure:3 bar	5.8 VDC	approx. 11 VDC test voltage The voltage level is not loadable.	0 VDC
		Using multimeter (ampere meter), open and measure pin 73.	1.1 ADC	-	-

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
		Field pressure:15 bar	4.8 VDC	approx. 11 VDC test voltage The voltage level is not loadable.	0 VDC
		Using multimeter (ampere meter), open and measure pin 73.	0.9 ADC	-	-
		Field pressure:30 bar	4.6 VDC	approx. 11 VDC test voltage The voltage level is not loadable.	0 VDC
		Using multimeter (ampere meter), open and measure pin 73.	0.87 ADC	-	-
		Field pressure:50 bar	4.1 VDC	approx. 11 VDC test voltage The voltage level is not loadable.	0 VDC
		Using multimeter (ampere meter), open and measure pin 73.	0.8 ADC	-	-

NOTE: *see §19*
see §20

26 A050 front axle suspension – 1-circuit brake system

Circuit diagram: Front axle suspension – 1-circuit brake system – "40/50 Km/h version"

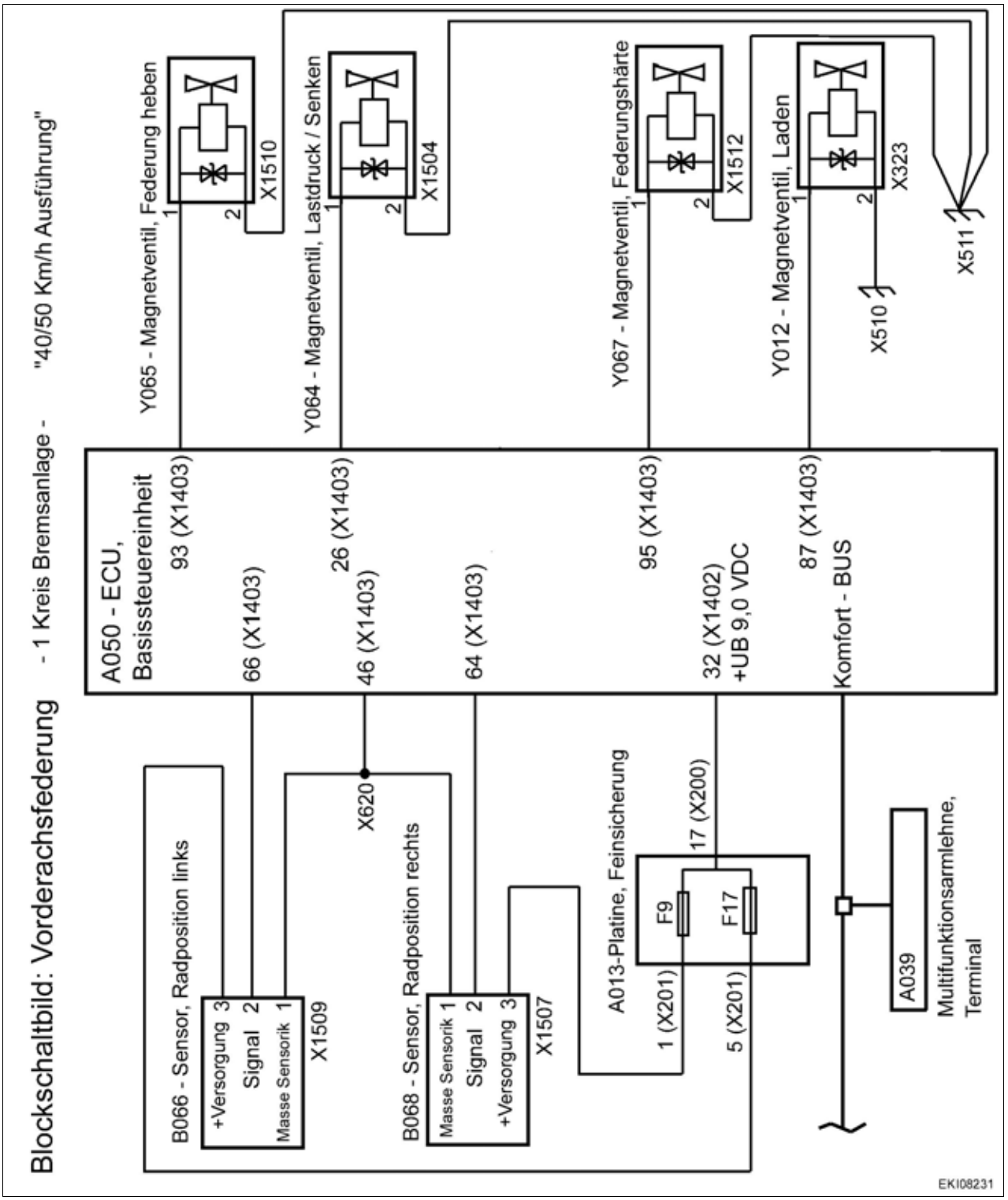


Fig. 73. I002747

NOTE: *Applicable to: 1-circuit brake system "40 km/h and 50 km/h version" (two brake pedals)*

Pin assignment and signal values at the A050 ECU, basic control unit

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.201 adapter cable to the **A050** - ECU, basic control unit and measure the pins (see table).* *see §34*

Prerequisite for this measurement:

– Measure sensor system **earth** at pin **46 X1403 [A]** - Separation point on A050
– Measure electronics **earth** at pin **22 X1403 [A]** - Separation point on A050

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
B066 - Sensor, wheel position (left) (**Earth** pin **46**)					
32 (X1402)	**+ supply** Ignition ON.				
		+UB 8.5 VDC	8.5 VDC	8.5 VDC	0 VDC
66 (X1403) (Current input)	**Signal** Ignition ON. Engine is running				
		Raise front axle suspension to upper limit position	1.0 VDC	0 VDC	6.8 VDC
		Using multimeter (ampere meter), open and measure pin 66.	4.9 mADC		
		Front axle suspension in central position	approx. 2.1 VDC		
		Using multimeter (ampere meter), open and measure pin 66.	approx. 10.6 mADC		
		Lower front axle suspension to lower limit position	4.0 VDC		
		Using multimeter (ampere meter), open and measure pin 66.	19.6 mADC		
B068 - Sensor, wheel position (right) (**Earth** pin **46**)					
32 (X1402)	**+ supply** Ignition ON.				
		+UB 8.5 VDC	8.5 VDC	8.5 VDC	0 VDC
64 (X1403) Current input	**Signal** Ignition ON. Engine is running				
		Raise front axle suspension to upper limit position	4.0 VDC	0 VDC	6.8 VDC
		Using multimeter (ampere meter), open and measure pin 64.	19.6 mADC		
		Front axle suspension in central position	approx. 2.1 VDC		

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
		Using multimeter (ampere meter), open and measure pin 64.	approx. 10.6 mADC		
		Lower front axle suspension to lower limit position	1.0 VDC		
		Using multimeter (ampere meter), open and measure pin 64.	4.9 mADC		
Y012 - Oil pre-heater/load suspension solenoid valve (**Earth** pin **22**)					
87 (X1403) Digital output	**Actuation** Ignition ON. Engine is running				
		Front axle suspension not actuated	0 VDC	12 VDC test voltage. The voltage level is not loadable.	0 VDC
		Raise or lower front axle suspension	14 VDC		
		Using multimeter (ampere meter), open and measure pin 87. Raise or lower front axle suspension	1.6 ADC	-	-
Y064 - Suspension load pressure/lowering solenoid valve (**Earth** pin **22**)					
26 (X1403) PWM signal	**Actuation** Ignition ON. Engine is running				
	Note: **To lower** the front axle suspension, press and hold the "Lock suspension" button for min. 3 seconds. **To raise** the front axle suspension, press and hold the "Suspension ON" button for min. 3 seconds.	Front axle suspension not actuated	0 VDC	11 VDC test voltage The voltage level is not loadable.	0 VDC
		Raising front axle suspension	approx. 5.6 VDC		
		Using multimeter (ampere meter), open and measure pin 26. Raising front axle suspension	approx. 0.6 ADC	-	-

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
		Lower front axle suspension	approx. 6.1 VDC	11 VDC test voltage The voltage level is not loadable.	0 VDC
		Using multimeter (ampere meter), open and measure pin 26. Lower front axle suspension	0.8 ADC	-	-
Y065 - Raise suspension solenoid valve (**Earth** pin **22**)					
93 (X1403) Digital output	**Actuation** Ignition ON. Engine is running				
	Note: **To lower** the front axle suspension, press and hold the "Lock suspension" button for min. 3 seconds. **To raise** the front axle suspension, press and hold the "Suspension ON" button for min. 3 seconds.	Front axle suspension not actuated	0 VDC	11 VDC test voltage The voltage level is not loadable.	0 VDC
		Raising front axle suspension	14 VDC		
	Note: The Y065 solenoid valve is energised only during the lifting operation.	Using multimeter (ampere meter), open and measure pin 93. Raising front axle suspension	1.6 ADC	-	-
Y067 - Lock suspension solenoid valve (**Earth** pin **22**)					
95 (X1403) Digital output	**Actuation** Ignition ON. Engine is running				
	Note: **To lock** the front axle suspension, briefly press the "Lock suspension" button for less than 3 seconds. The front axle suspension remains in the central position, the suspension hardness increases.	Front axle suspension not actuated	0 VDC	12 VDC test voltage. The voltage level is not loadable.	0 VDC
		Switch on the front axle suspension lock mode.	14 VDC		
		Using multimeter (ampere meter), open and measure pin 95. Switch on the front axle suspension lock mode.	2.7 ADC	-	-

NOTE: *see §19*
see §3

27 A050 front axle suspension – 2-circuit brake system

Circuit diagram: Front axle suspension – 2-circuit brake system - "40 Km/h - 50 Km/h - 60 Km/h version"

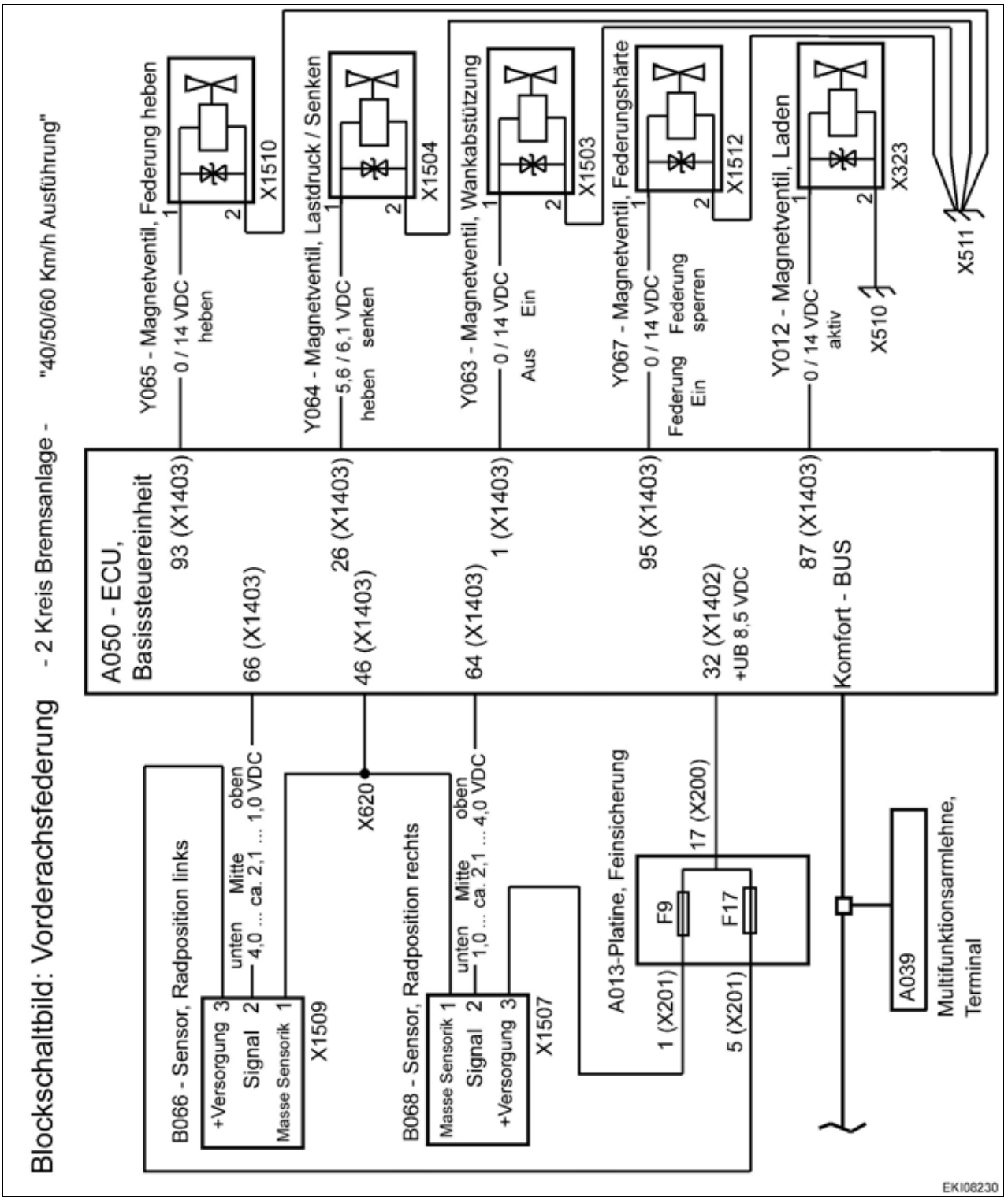


Fig. 74. I001896

NOTE: *Applies to: 40 Km/h - 50 Km/h -60 Km/h version (one brake pedal)*

Pin assignment and signal values on the **A050** - ECU, basic control unit

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.201 adapter cable to the **A050** - ECU, basic control unit and measure the pins (see table).* *see §34*

Prerequisite for this measurement:

– Measure sensor system **earth** at pin **46 X1403 [A]** - Separation point on A050
– Measure electronics **earth** at pin **22 X1403 [A]** - Separation point on A050

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
B066 - Sensor, wheel position (left) (**Earth** pin **46**)					
32 (X1402)	**+ supply** Ignition ON.				
		+UB 8.5 VDC	8.5 VDC	8.5 VDC	0 VDC
66 (X1403)	**Signal** Ignition ON. Engine is running				
(Current input)		Raise front axle suspension to upper limit position	1.0 VDC	0 VDC	6.8 VDC
		Using multimeter (ampere meter), open and measure pin 66.	4.9 mADC		
		Front axle suspension in central position	approx. 2.1 VDC		
		Using multimeter (ampere meter), open and measure pin 66.	approx. 10.6 mADC		
		Lower front axle suspension to lower limit position	4.0 VDC		
		Using multimeter (ampere meter), open and measure pin 66.	19.6 mADC		
B068 - Sensor, wheel position (right) (**Earth** pin **46**)					
32 (X1402)	**+ supply** Ignition ON.				
		+UB 8.5 VDC	8.5 VDC	8.5 VDC	0 VDC
64 (X1403)	**Signal** Ignition ON. Engine is running				
(Current input)		Raise front axle suspension to upper limit position	4.0 VDC	0 VDC	6.8 VDC
		Using multimeter (ampere meter), open and measure pin 64.	19.7 mADC		
		Front axle suspension in central position	approx. 2.1 VDC		

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
		Using multimeter (ampere meter), open and measure pin 64.	approx. 10.6 mADC		
		Lower front axle suspension to lower limit position	1.0 VDC		
		Using multimeter (ampere meter), open and measure pin 64.	4.9 mADC		
Y012 - Oil pre-heater/load suspension solenoid valve (**Earth** pin **22**)					
87 (X1403)	**Actuation** Ignition ON. Engine is running				
(digital output)		Front axle suspension not actuated	0 VDC	12 VDC test voltage. The voltage level is not loadable.	0 VDC
		Raise or lower front axle suspension	14 VDC		
		Using multimeter (ampere meter), open and measure pin 87. Raise or lower front axle suspension	1.6 ADC	-	-
Y063 - Wobble stabiliser solenoid valve (**Earth** pin **22**)					
1 (X1403)	**Actuation** Ignition ON. Engine is running				
(PWM signal)		Wobble support not activated (speed lower than 15 Km/h)	0 VDC	11 VDC test voltage The voltage level is not loadable.	0 VDC
	Condition for switching on wobble stabiliser: The sensors B066 and B068 must show the same wheel position (maximum discrepancy = 20 mm).	Wobble support activated (tractor in suspension mode and speed higher than 40 Km/h)	14 VDC		
		Using multimeter (ampere meter), open and measure pin 1. Wobble support activated	2.9 ADC	-	-
Y064 - Suspension load pressure/lowering solenoid valve (**Earth** pin **22**)					

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
26 (X1403)	**Actuation** Ignition ON. Engine is running				
(PWM signal)		Front axle suspension not actuated	0 VDC	11 VDC test voltage The voltage level is not loadable.	0 VDC
	Note: To lower the front axle suspension, press and hold the "Lock suspension" button for min. 3 seconds. To raise the front axle suspension, press and hold the "Suspension ON" button for min. 3 seconds.				
		Raising front axle suspension	5.6 VDC		
		Using multimeter (ampere meter), open and measure pin 26. Raising front axle suspension	0.6 ADC	-	-
		Lower front axle suspension	6.1 VDC	11 VDC test voltage The voltage level is not loadable.	0 VDC
		Using multimeter (ampere meter), open and measure pin 26. Lower front axle suspension	0.8 ADC	-	-
Y065 - Raise suspension solenoid valve (**Earth** pin **22**)					
93 (X1403)	**Actuation** Ignition ON. Engine is running				
(digital output)	**Note:** To raise the front axle suspension, press and hold the "Suspension ON" button for min. 3 seconds.	Front axle suspension not actuated	0 VDC	12 VDC test voltage. The voltage level is not loadable.	0 VDC
		Raising front axle suspension	14 VDC		
	Note: The Y065 solenoid valve is energised only during the lifting operation.	Using multimeter (ampere meter), open and measure pin 93. Raising front axle suspension	1.6 ADC	-	-
Y067 - Lock suspension solenoid valve (**Earth** pin **22**)					

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
95 (X1403)	**Actuation** Ignition ON. Engine is running				
(digital output)	**Note:** To lock the front axle suspension, briefly press the "Lock suspension" button for less than 3 seconds. The front axle suspension remains in the central position, the suspension hardness increases.	Front axle suspension not actuated	0 VDC	12 VDC test voltage. The voltage level is not loadable.	0 VDC
		Switch on the front axle suspension lock mode.	14 VDC		
		Using multimeter (ampere meter), open and measure pin 95. Switch on the front axle suspension lock mode.	2.7 ADC	-	-

NOTE: *see §19*
see §3

28 A050 "HZW" rear PTO

NOTE: *see §19*
see §20

Circuit diagram: rear PTO

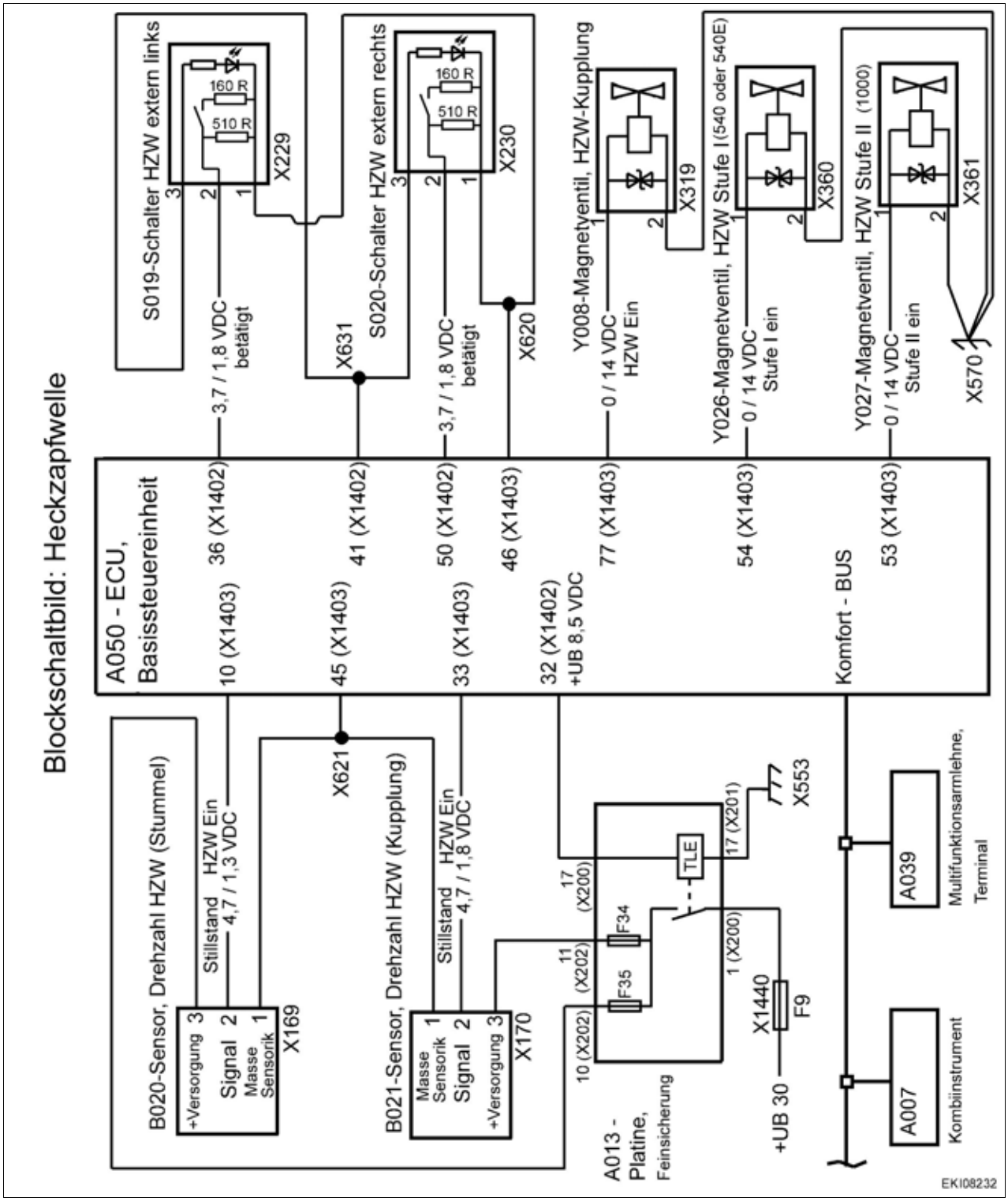


Fig. 75. I001897

Pin assignment and signal values at the A050 ECU, basic control unit

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.201 adapter cable to the **A050** - ECU, basic control unit and measure the pins (see table).* *see §34*

Prerequisite for this measurement:

- Measure sensor system **earth** at pin **45 X1403 [A]** - Separation point on A050
- Measure sensor system **earth** at pin **46 X1403 [A]** - Separation point on A050
- Measure electronics **earth** at pin **22 X1403 [A]** - Separation point on A050
- Measure electronics **earth** at pin **2 X1402 [B]** - Separation point on A050

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
B020 - Sensor, rear PTO speed (stub shaft) (**Earth** pin **45**)					
10 (X1403)	**Signal** Ignition ON, Engine is running				
Frequency input		Rear PTO stationary	4.7 VDC	6.3 VDC	0 VDC
		Rear PTO rotates	1.3 VDC		
B021 - Sensor, rear PTO speed (clutch) (**Earth** pin **45**)					
33 (X1403)	**Signal** Ignition ON, Engine is running				
Frequency input		Front PTO stationary, depending on ratchet wheel position	4.7 VDC	6.3 VDC	0 VDC
		Rear PTO rotates	1.8 VDC		
S019 - Button, rear PTO, external left (**Earth** pin **46**)					
36 (X1402)	**Signal** Ignition ON.				
Digital input		S019 switch not activated	3.7 VDC	6.1 VDC	0 VDC
		S019 switch activated	1.8 VDC		
41 (X1402)	**LED, rear PTO** Ignition ON. Engine is running				
Digital output		Rear PTO disengaged (LED OFF)	0 VDC	14 VDC	0 VDC
		Rear PTO engaged (LED ON)	14 VDC		
S020 - Button, rear PTO, external right (**Earth** pin **46**)					
50 (X1402)	**Signal** Ignition ON.				
Digital input		S020 switch not activated	3.7 VDC	6.1 VDC	0 VDC
		S020 switch activated	1.8 VDC		

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
41 (X1402)	**LED, rear PTO** Ignition ON. Engine is running				
Digital output		Rear PTO disengaged (LED OFF)	0 VDC	14 VDC	0 VDC
		Rear PTO engaged (LED ON)	14 VDC		
Y008 - Solenoid valve, rear PTO (clutch) (**Earth** pin **22**)					
77 (X1403)	**Actuation** Ignition ON. Engine is running				
PWM signal		Rear PTO disengaged	0 VDC	11 VDC test voltage The voltage level is not loadable.	0 VDC
		Rear PTO engaged	14 VDC		
		Using multimeter (ampere meter), open and measure pin 77. Engage rear PTO	1.7 ADC	-	-
Y026 - Solenoid valve, rear PTO, stage I (**Earth** pin **22**)					
54 (X1403)	**Actuation** Ignition ON. Engine is running				
PWM signal		Rear PTO stage I disengaged	0 VDC	11 VDC test voltage The voltage level is not loadable.	0 VDC
		Rear PTO stage I engaged	14 VDC		
		Using multimeter (ampere meter), open and measure pin 54. Switch on rear PTO stage I.	1.5 ADC		
Y027 - Solenoid valve, rear PTO, stage II (**Earth** pin **22**)					
53 (X1403)	**Actuation** Ignition ON. Engine is running				

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
PWM sig-nal		Rear PTO stage II disengaged	0 VDC	11 VDC test voltage The voltage level is not loadable.	0 VDC
		Rear PTO stage II engaged	14 VDC		
		Using multimeter (ampere meter), open and measure pin 53. Switch on rear PTO stage II.	1.5 ADC	-	-

NOTE: *see §19*

29 A050 front PTO

Circuit diagram: front PTO

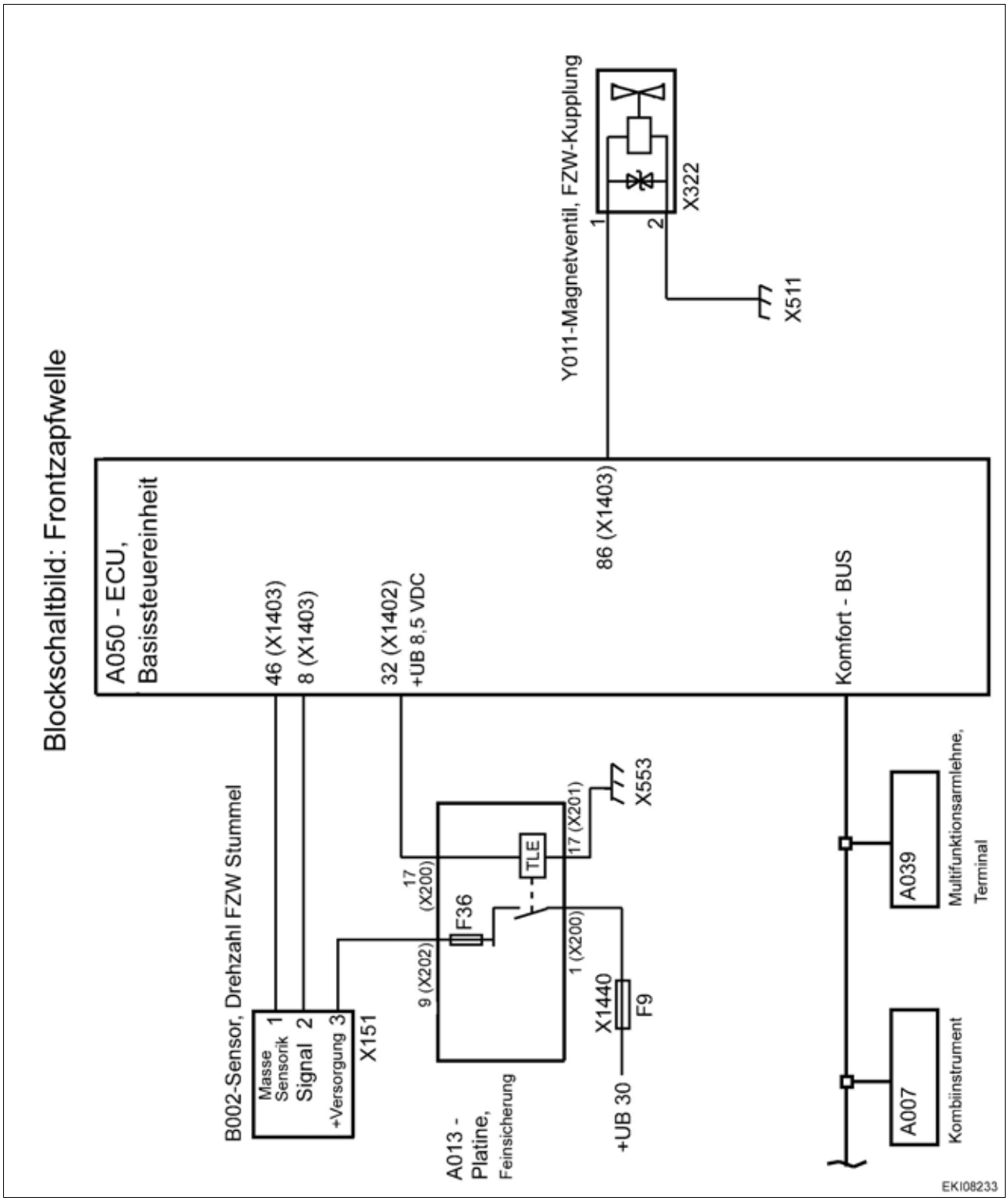


Fig. 76. I003077

Pin assignment and signal values on the **A050** - ECU, basic control unit

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.201 adapter cable to the **A050** - ECU, basic control unit and measure the pins (see table).* *see §34*

Prerequisite for this measurement:

– Measure sensor system **earth** at pin **46 X1403 [A]** - Separation point on A050
– Measure electronics **earth** at pin **22 X1403 [A]** - Separation point on A050

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
B002 - Sensor, front PTO speed (**Earth** pin **46**)					
8 (X1403)	**Signal** Ignition ON.				
Frequency input		Front PTO stationary, depending on ratchet wheel position	4.7/1.0 VDC	6.3 VDC	0 VDC
		Front PTO rotates	approx. 2.1 VDC		
Y011 - Front PTO solenoid valve (clutch) (**Earth** pin **22**)					
86 (X1403)	**Actuation** Ignition ON. Engine is running				
PWM signal		Front PTO disengaged	0 VDC	approx. 11 VDC test voltage The voltage level is not loadable.	0 VDC
		Front PTO engaged	14 VDC		
		Using multimeter (ampere meter), open and measure pin 86. Couple the front PTO	Approx. 1.7 ADC	-	-

NOTE: *see §19*

30 A050 4WD and differential lock (front and rear)

Circuit diagram: 4WD and differential lock (front and rear)

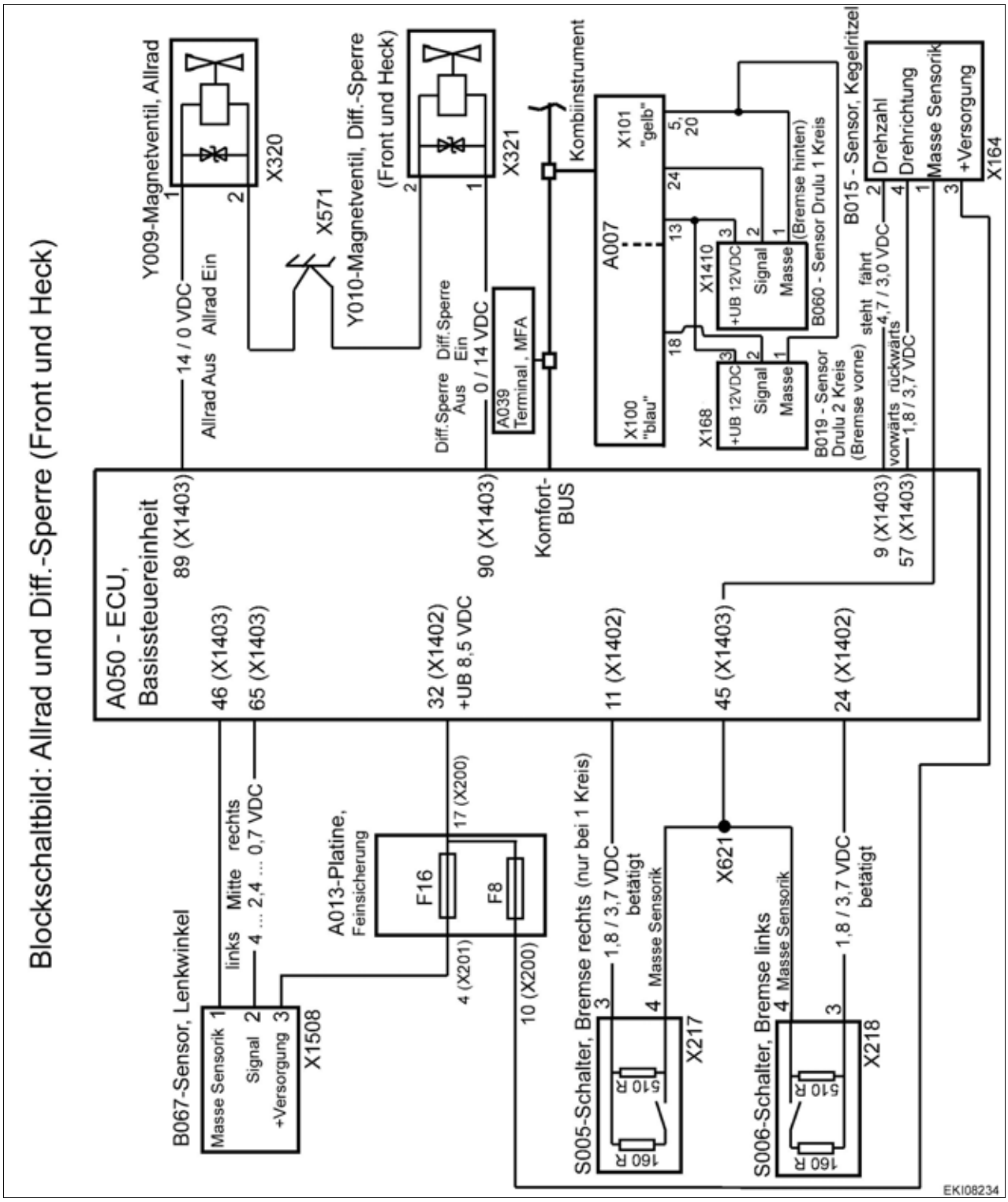


Fig. 77. I001904

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.201 adapter cable to the **A050** - ECU, basic control unit and measure the pins (see table).* *see §34*

Prerequisite for this measurement:

– Measure sensor system **earth** at pin **45 X1403 [A]** - Separation point on A050
– Measure sensor system **earth** at pin **46 X1403 [A]** - Separation point on A050
– Measure electronics **earth** at pin **22 X1403 [A]** - Separation point on A050

Pin assignment and signal values at the A050 ECU, basic control unit

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
B067 - Sensor, steering angle (**Earth** pin **46**)					
32 (X1402)	**+ supply** Ignition ON.				
		+UB 8.5 VDC	8.5 VDC	8.5 VDC	0 VDC
65 (X1403)	**Signal** Ignition ON, Engine is running				
Current input		Turn the steering wheel to left steering stop	4.0 VDC	0 VDC	6.7 VDC
		Using multimeter (ampere meter), open and measure pin 65. Turn the steering wheel to left steering stop	19 mADC	-	-
		Bring steering wheel to centre position **Note:** Set the wheels straight and advance the tractor slowly, the steering wheel will find the centre position.	2.4 VDC	0 VDC	6.7 VDC
		Using multimeter (ampere meter), open and measure pin 65. Set the steering wheel to centre position.	12 mADC	-	-
		Turn the steering wheel to right steering stop	0.7 VDC	0 VDC	6.7 VDC
		Using multimeter (ampere meter), open and measure pin 65. Turn the steering wheel to right steering stop	3.6 mADC	-	-
S005 - Switch, right brake - (only installed in 1-circuit brake system) (**Earth** pin **45**)					
11 (X1402)	**Signal** Ignition ON.				

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
Digital input		Brake pedal (right) not depressed	1.8 VDC	6.1 VDC	0 VDC
		Brake pedal (right) depressed	3.7 VDC		
S006 - Switch, left brake (**Earth** pin **45**)					
24 (X1402)	**Signal** Ignition ON.				
Digital input		Brake pedal (left) not depressed	1.8 VDC	6.1 VDC	0 VDC
		Brake pedal (left) depressed	3.7 VDC		
Y009 - Solenoid valve, 4WD (**Earth** pin **22**)					
89 (X1403)	**Actuation** Ignition ON. Engine is running				
Digital out-put		4WD on	0 VDC	12 VDC test voltage. The voltage level is not loadable.	0 VDC
		4WD off	14 VDC		
		Using multimeter (ampere meter), open and measure pin 89. Engage 4WD.	1.5 ADC	-	-
Y010 - Solenoid valve, differential lock (**Earth** pin **22**)					
90 (X1403)	**Actuation** Ignition ON. Engine is running				
Digital out-put		Diff. lock off	0 VDC	12 VDC test voltage. The voltage level is not loadable.	0 VDC
		Diff. lock on	14 VDC		
		Using multimeter (ampere meter), open and measure pin 90. Engage differential lock.	1.5 ADC	-	-

NOTE: *see §19*

NOTE: ***1-circuit braking system****: 4WD is activated when braking from a speed faster than 25 km/h. Should the* ***B060*** *- Compressed air supply sensor detect a pressure lower than 4,65 bar, then 4WD is permanently activated*

2-circuit braking system*: Should the* ***B060*** *- Compressed air supply sensor or the* ***B019*** *- Sensor, compressed air supply detect a pressure lower than 4,65 bar, the 4WD is activated while braking.*

31 A050 Vario transmission control

Circuit diagram: Vario transmission control (Part 1)

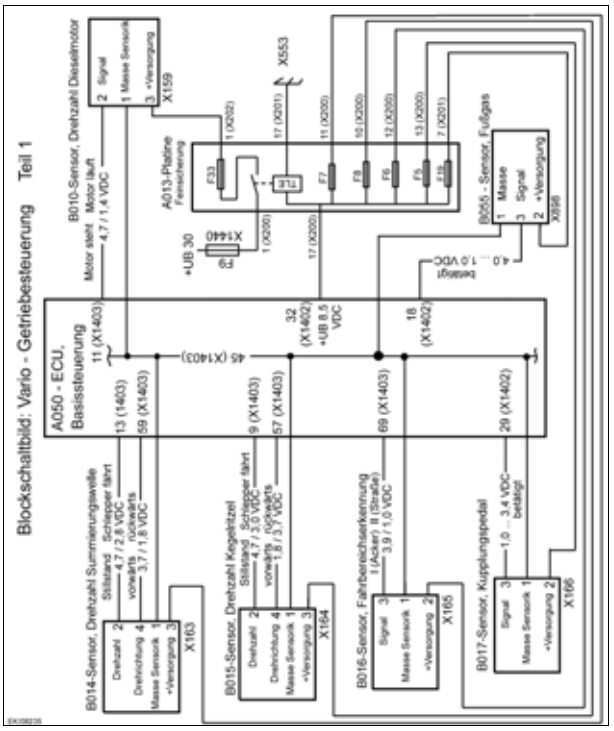


Fig. 78. I001906

Circuit diagram: Vario transmission control (Part 2)

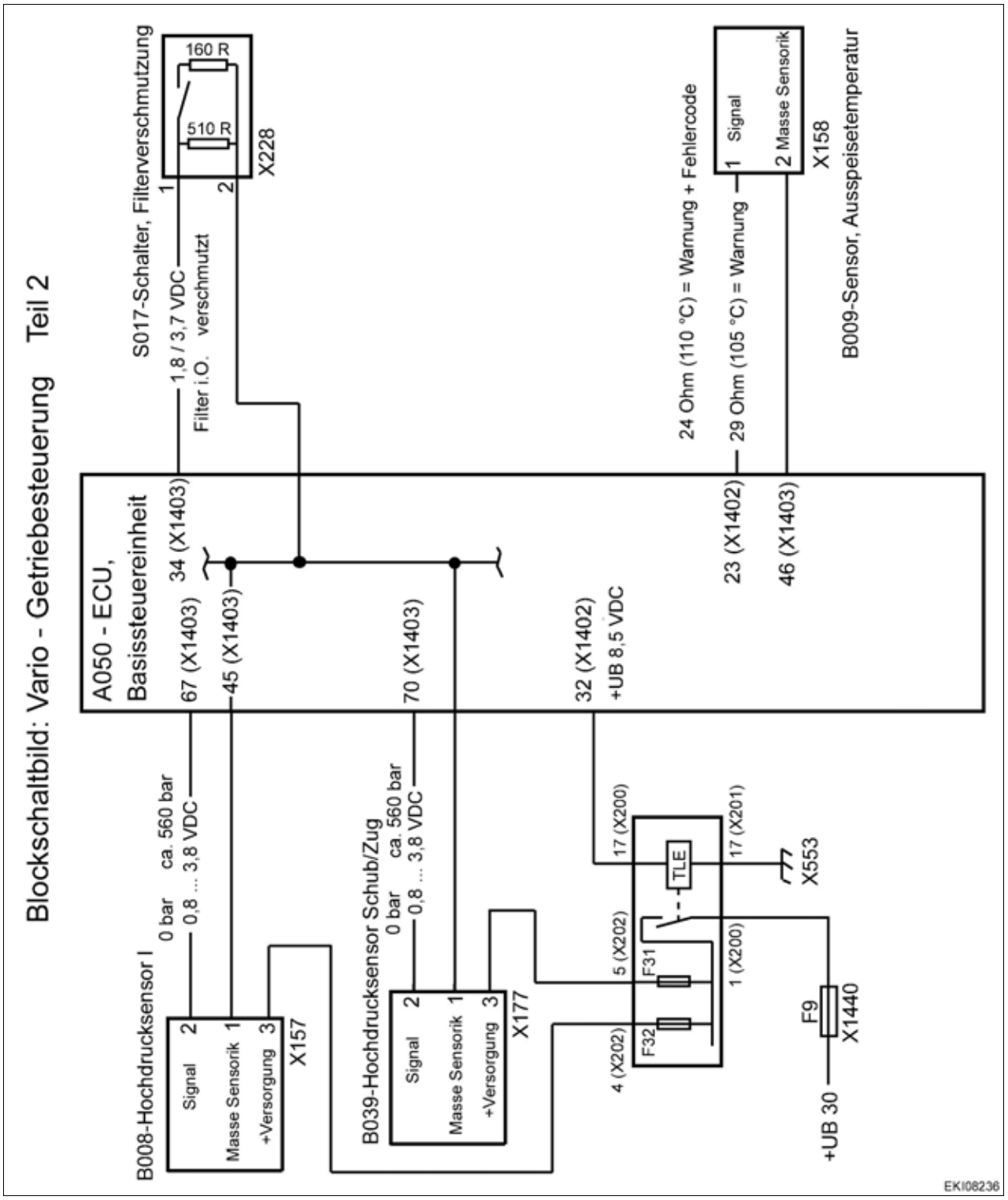


Fig. 79.

I001907

Circuit diagram: Vario transmission control (Part 3)

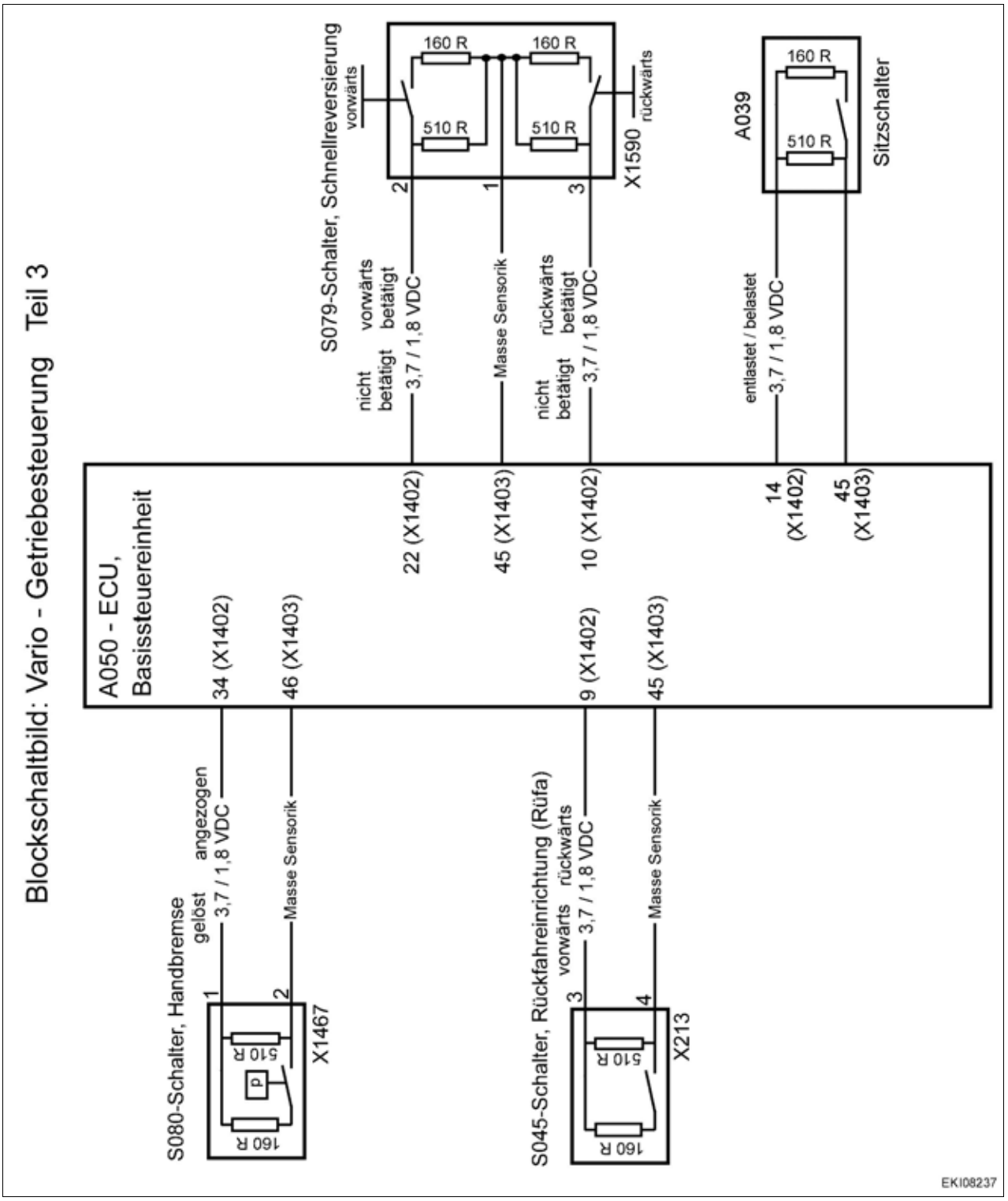


Fig. 80. I001908

Circuit diagram: Vario transmission control (Part 4) "Emergency operation"

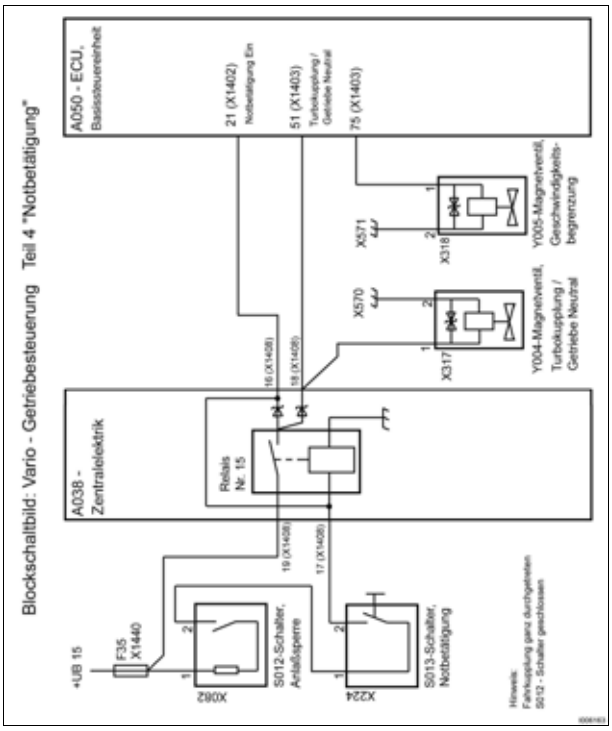


Fig. 81. I006163

Circuit diagram: Vario transmission control (Part 5)

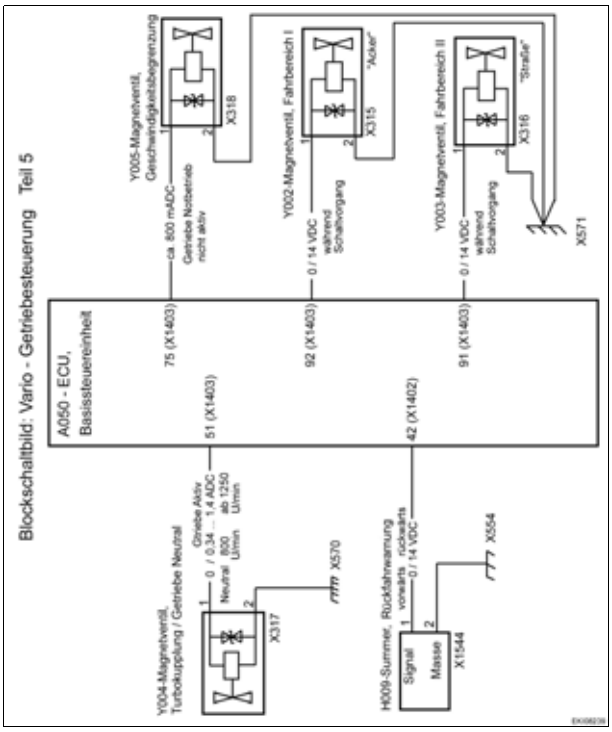


Fig. 82. I001910

Circuit diagram: Vario transmission control (Part 6)

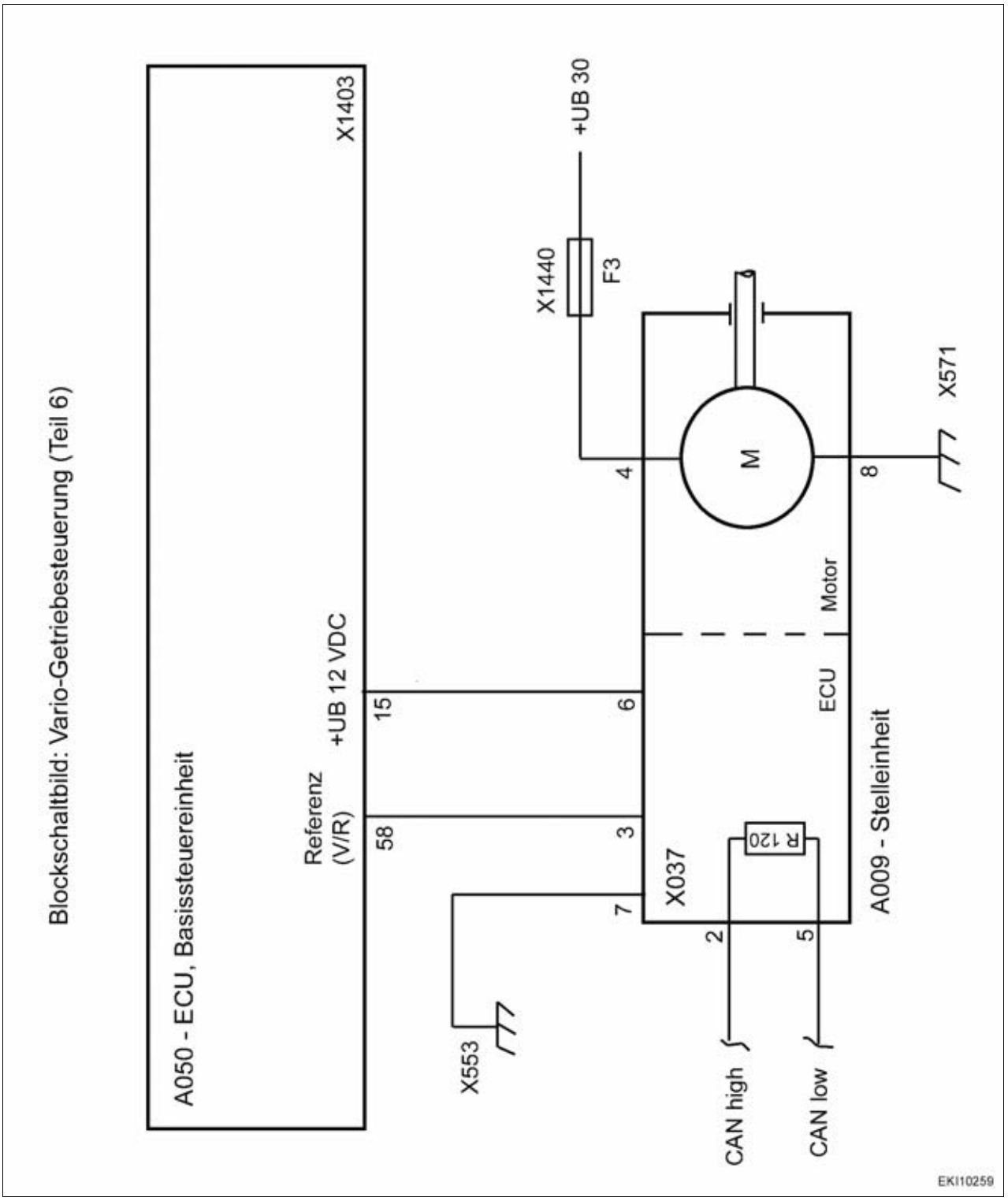


Fig. 83. I009463

Pin assignment and signal values at the A050 ECU, basic control unit

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.201 adapter cable to the **A050** - ECU, basic control unit and measure the pins (see table).* *see §34*

Prerequisite for this measurement:

- Measure sensor system **earth** at pin **45 X1403 [A]** - Separation point on A050
- Measure sensor system **earth** at pin **46 X1403 [A]** - Separation point on A050
- Measure electronics **earth** at pin **22 X1403 [A]** - Separation point on A050
- Measure electronics **earth** at pin **2 X1402 [B]** - Separation point on A050

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
A009 - Actuator unit (**Earth** pin **45**)					
15 (X1403)	**Supply**				
			12 to 14 VDC	12 to 14 VDC	0 VDC
58 (X1403)	**Reference F/R** (Forward/reverse)	Ignition ON. Slowly turn A009 actuator unit by hand. The current signal must alternate between 1.8 VDC and 3.7 VDC.			
			1.8 VDC or 3.7 VDC	6.1 VDC	0 VDC
A039 - MFA, multifunction armrest - seat switch (**Earth** pin **45**) **Note: the seat switch is a component of the A039 multifunction armrest MFA.**					
14 (X1402)	**Signal** Ignition ON.				
Digital input		Driver seat not loaded (switch open = 510 ohms).	3.7 VDC	6.1 VDC	0 VDC
		Driver seat loaded (switch closed = 121 ohms).	1.8 VDC		
B008 - Sensor, high-pressure 1 (**Earth** pin **45**)					
67 (X1403)	**Signal** Ignition ON. Engine is running				
Current input	**Note:** Perform high-pressure test for max. 5 seconds (oil heating)	**Press neutral button "N" (transmission in neutral)**			
		High-pressure = 0 bar	approx. 0.8 VDC	0 VDC	14 VDC
		Transmission in "ACTIVE STATIONARY", engine speed higher than 1400 rpm			
		High pressure = 30 bar	0.94 VDC		
		Using multimeter (ampere meter), open and measure pin 67.	4.7 mADC		

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
		High pressure = 100 bar	1.37 VDC		
		Using multimeter (ampere meter), open and measure pin 67.	6.7 mADC		
		High pressure = 200 bar	1.9 VDC		
		Using multimeter (ampere meter), open and measure pin 67.	9.2 mADC		
		High pressure = 300 bar	2.5 VDC		
		Using multimeter (ampere meter), open and measure pin 67.	12 mADC		
		High pressure = 400 bar	3.0 VDC		
		Using multimeter (ampere meter), open and measure pin 67.	14.6 mADC		
		High-pressure = 560 bar	3.8 VDC		
		Using multimeter (ampere meter), open and measure pin 67.	18.7 mADC		
B009 - Discharge temperature sensor (**Earth** pin **46**)					
23 (X1402)	**Signal** Ignition ON.				
		Discharge temperature = 50 °C	210 ohms		
		Discharge temperature = 60 °C	147 ohms		
		Discharge temperature = 87 °C	51 ohms		
		Discharge temperature = 100 °C	37 ohms		
		Discharge temperature = 105 °C (warning message)	29 ohms		
		Discharge temperature = 110 °C (warning message + fault code)	24 ohms		
B010 - Sensor, engine speed (**Earth** pin **45**)					
11 (X1403)	**Signal** Ignition ON.				
Frequency input		Diesel engine stationary	4.7 VDC	6.3 VDC	0 VDC
		Diesel engine running	1.4 VDC		

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
B014 - Sensor, collecting shaft (**Earth** pin **45**)					
13 (X1403)	**Signal (speed)** Ignition ON. Engine is running				
Frequency input		Tractor stationary (depending on ratchet wheel setting)	4.7/1.0 VDC	6.3 VDC	0 VDC
		Tractor moving	2.8 VDC		
59 (X1403)	**Signal (rotational direction)** Ignition ON. Engine is running				
Digital input		Tractor advancing	3.7 VDC	6.1 VDC	0 VDC
		Tractor reversing	1.8 VDC		
B015 - Sensor, bevel pinion (**Earth** pin **45**)					
9 (X1403)	**Signal (speed)** Ignition ON. Engine is running				
Frequency input		Tractor stationary (depending on ratchet wheel setting)	4.7/1.0 VDC	6.3 VDC	0 VDC
		Tractor moving	3.0 VDC		
57 (X1403)	**Signal (rotational direction)** Ignition ON. Engine is running				
Digital input		Tractor advancing	1.8 VDC	6.1 VDC	0 VDC
		Tractor reversing	3.7 VDC		
B016 - Sensor, travel range detection (**Earth** pin **45**)					
69 (X1403)	**Signal** Ignition ON. Engine is running				
Current input		Tractor in travel range I "field"	3.9 VDC	0 VDC	6.8 VDC
		Using multimeter (ampere meter), open and measure pin 69.	19 mADC		
		Tractor in travel range II "road"	1.0 VDC		
		Using multimeter (ampere meter), open and measure pin 69.	5 mADC		
B017 - Sensor, clutch pedal (**Earth** pin **45**)					
29 (X1402)	**Signal** Ignition ON.				

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
Current input		Clutch pedal not depressed	1.0 VDC	0 VDC	6.8 VDC
		Using multimeter (ampere meter), open and measure pin 29.	5 mADC		
		Clutch pedal depressed	3.4 VDC		
		Using multimeter (ampere meter), open and measure pin 29.	17 mADC		
B039 - Sensor, high-pressure 2 (**Earth** pin **45**)					
70 (X1403)	**Signal** Ignition ON. Engine is running				
Current input	**Note:** Perform high-pressure test for max. 5 seconds (oil heating)				
		Press neutral button "N" (transmission in neutral)			
		High-pressure = 0 bar	0.8 VDC	0 VDC	14 VDC
		Transmission in "ACTIVE STATIONARY", engine speed higher than 1400 rpm			
		High pressure = 30 bar	0.94 VDC		
		Using multimeter (ampere meter), open and measure pin 70.	4.7 mADC		
		High pressure = 100 bar	1.4 VDC		
		Using multimeter (ampere meter), open and measure pin 70.	6.7 mADC		
		High pressure = 200 bar	1.9 VDC		
		Using multimeter (ampere meter), open and measure pin 70.	9.2 mADC		
		High pressure = 300 bar	2.5 VDC		
		Using multimeter (ampere meter), open and measure pin 70.	12 mADC		
		High pressure = 400 bar	3.0 VDC		
		Using multimeter (ampere meter), open and measure pin 70.	14.6 mADC		

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
		High pressure = 560 bar	3.8 VDC		
		Using multimeter (ampere meter), open and measure pin 70.	18.7 mADC		
B055 - Sensor, foot throttle (**Earth** pin **45**)					
18 (X1402)	**Signal** Ignition ON.				
Current input		Throttle pedal not actuated	4.0 VDC	0 VDC	6.8 VDC
		Using multimeter (ampere meter), open and measure pin 18.	19 mADC		
		Throttle pedal actuated	1.0 VDC		
		Using multimeter (ampere meter), open and measure pin 18.	5 mADC		
H009 - Blip signal, reversing (**Earth** pin **22**)					
42 (X1402)	**Actuation** Ignition ON. Engine is running				
Digital output		Tractor stationary	0 VDC	0/14 VDC	0 VDC
		Tractor advancing	0 VDC		
		Tractor reversing	14 VDC		
S017 - Filter contamination switch (**Earth** pin **45**)					
34 (X1403)	**Signal** Ignition ON. Engine is running				
Digital input		Transmission high-pressure filter OK (S017 switch closed)	1.8 VDC	6.1 VDC	0 VDC
		Transmission high-pressure filter clogged (S017 switch open)	3.7 VDC		
S045 - Switch, reversing driver stand (**Earth** pin **45**)					
9 (X1402)	**Signal** Ignition ON.				
Digital input		Driver seat facing forwards	3.7 VDC	6.1 VDC	0 VDC
		Driver seat facing backwards	1.8 VDC		

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
S079 - Switch, steering column (**Earth** pin **45**)					
22 (X1402)	**Signal (forwards)** Ignition ON.				
Digital input		Switch not actuated	3.7 VDC	6.1 VDC	0 VDC
		Switch actuated forwards			
		Switch actuated backwards	1.8 VDC		
10 (X1402)	**Signal (backwards)** Ignition ON.				
Digital input		Switch not actuated	3.7 VDC	6.1 VDC	0 VDC
		Switch actuated backwards			
		Switch actuated forwards	1.8 VDC		
S080 - Switch, hand brake (**Earth** pin **46**)					
34 (X1402)	**Signal** Ignition ON.				
Digital input		Hand brake released	3.7 VDC	6.1 VDC	0 VDC
		Hand brake applied	1.8 VDC		
Y002 - Solenoid valve, travel range I (**Earth** pin **22**)					
92 (X1403)	**Actuation** Ignition ON. Engine is running				
Digital out-put	**Note:** The Y002 solenoid valve is energised only during the switching operation	Switch tractor to travel range I "field"	14 VDC	12 VDC test voltage. The voltage level is not loadable.	0 VDC
		Using multimeter (ampere meter), open and measure pin 92.	1.3 ADC	-	-
Y003 - Solenoid valve, travel range II (**Earth** pin **22**)					
91 (X1403)	**Actuation** Ignition ON. Engine is running				
Digital out-put	**Note:** The Y003 solenoid valve is energised only during the switching operation	Switch tractor to travel range II "road"	14 VDC	12 VDC test voltage. The voltage level is not loadable.	0 VDC
		Using multimeter (ampere meter), open and measure pin 92.	1.3 ADC	-	-
Y004 - Solenoid valve, turbo-clutch (**Earth** pin **22**)					

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
51 (X1403)	**Actuation** Ignition ON. Engine is running Clutch not depressed	Using multimeter (ampere meter), open and measure pin 51.			
PWM signal		Apply hand brake or press neutral button "N" (**transmission in neutral**)			
		800 rpm	0 mA DC		
		Set transmission to "ACTIVE STATIONARY". **No gear ratio preselected**			
		800 rpm	0.37 ADC		
		1000 rpm	0.37 ADC		
		1200 rpm	0.37 ADC		
		from 1250 rpm	1.4 ADC		
		Gear ratio preselected			
		800 rpm	0.34 ADC		
		1000 rpm	0.56 ADC		
		1200 rpm	1.02 ADC		
		from 1250 rpm	1.4 ADC		
Y005 - Solenoid valve, speed governor (**Earth** pin **22**)					
75 (X1403)	**Actuation** Ignition ON. Engine is running				
PWM signal	**Note:** If the current (800 mADC) is exceeded or not reached, the maximum speed is limited to 30 Km/h	Transmission emergency mode not activated	800 mADC	-	-
		Transmission emergency mode activated (Maximum speed is limited to 30 km/h)	0 mA DC		

NOTE: *see §19*
see §20

32 A050 brake

Circuit diagram: Brake actuation (service brake, active hold function, hydraulic trailer brake)

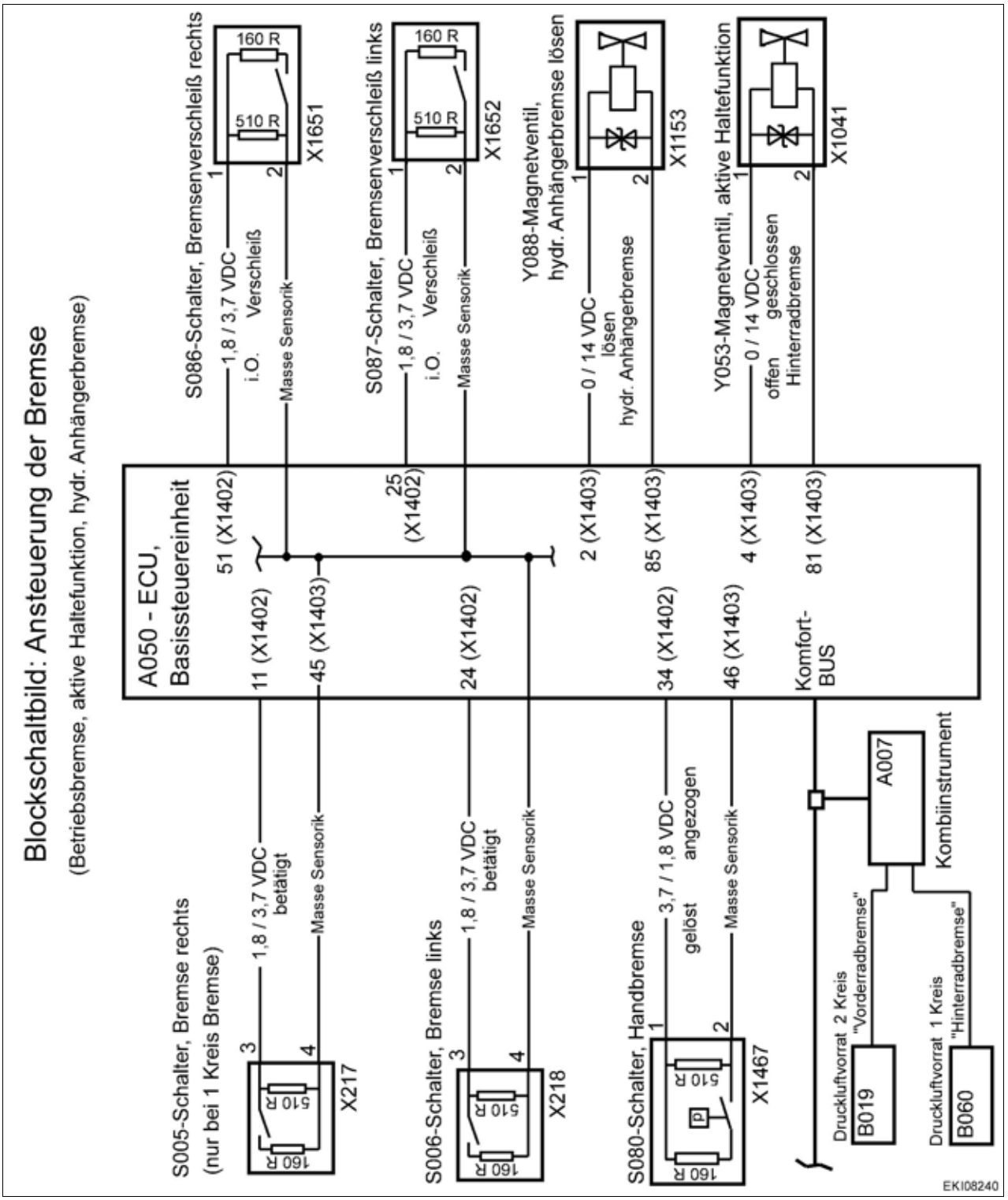


Fig. 84. I001921

Pin assignment and signal values on the **A050** - ECU, basic control unit

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.201 adapter cable to the **A050** - ECU, basic control unit and measure the pins (see table).* *see §34*

Prerequisite for this measurement:

- Measure sensor system **earth** at pin **45 X1403 [A]** - Separation point on A050
- Measure sensor system **earth** at pin **46 X1403 [A]** - Separation point on A050
- Measure electronics **earth** at pin **22 X1403 [A]** - Separation point on A050

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
S005 - Switch, right brake (**Earth** pin **45**) **Note: The S005 switch is only connected in 1-circuit brake systems (tractor has a steering brake)**					
11 (X1402)	**Signal** Ignition ON.				
Digital input		Brake (right) not actuated	1.8 VDC	6.1 VDC	0 VDC
		Brake (right) actuated	3.7 VDC		
S006 - Switch, left brake (**Earth** pin **45**)					
24 (X1402)	**Signal** Ignition ON.				
Digital input		Brake (left) not actuated	1.8 VDC	6.1 VDC	0 VDC
		Brake (left) actuated	3.7 VDC		
S080 - Switch, hand brake (**Earth** pin **46**)					
34 (X1402)	**Signal** Ignition ON.				
Digital input	**Note:** The hand brake is released with compressed air	Hand brake released	3.7 VDC	6.1 VDC	0 VDC
		Hand brake applied	1.8 VDC		
S086 - Switch, brake wearing, right (**Earth** pin **45**)					
51 (X1402)	**Signal** Ignition ON.				
Digital input		Brake pad OK (S086 switch not actuated)	1.8 VDC	6.1 VDC	0 VDC
		Brake pad worn (S086 switch actuated)	3.7 VDC		
S087 - Switch, brake wearing, left (**Earth** pin **45**)					
25 (X1402)	**Signal** Ignition ON.				
Digital input		Brake pad OK (S087 switch not actuated)	1.8 VDC	6.1 VDC	0 VDC
		Brake pad worn (S087 switch actuated)	3.7 VDC		

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
Y053 - Active hold function solenoid valve (**Earth** pin **22**)					
4 (X1403)	**Actuation (high)** Ignition ON. Engine is running				
PWM signal high	**Note:** If the driver returns the transmission ratio to "ACTIVE STATIONARY", the rear wheel brake will close after approx. 5 seconds				
		Rear wheel brake released	0 VDC	0 VDC	0 VDC
		Rear wheel brake closed.	14 VDC		
		Using multimeter (ampere meter), open and measure pin 4. Rear wheel brake closed.	1.5 ADC	-	-
81 (X1403)	**Actuation (low "virtual earth")** Ignition ON. Engine is running				
PWM signal (low)	**Note:** If the driver returns the transmission ratio to "ACTIVE STATIONARY", the rear wheel brake will close after approx. 5 seconds				
		Rear wheel brake released	0 VDC	0 VDC	0 VDC
		Rear wheel brake closed.	approx. 0.32 VDC		
Y088 - Solenoid valve, release trailer brake (**Earth** pin **22**)					
2 (X1403)	**Actuation (high)** Ignition ON. Engine is running				
PWM signal high		Do not press release hydraulic trailer brake button	0 VDC	0 VDC	0 VDC
		Hand brake applied Press release hydraulic trailer brake button --> Hydraulic trailer brake is released	14 VDC	0 VDC	0 VDC
		Using multimeter (ampere meter), open and measure pin 2. Hydraulic trailer brake released.	1.5 ADC	-	-
85 (X1403)	**Actuation** Ignition ON. Engine is running				

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from compo-nent
PWM sig-nal (low)		Do not press release hydraulic trailer brake button	0 VDC	0 VDC	0 VDC
		Hand brake applied Press release hydraulic trailer brake button --> The hydraulic trailer brake is released	approx. 0.32 VDC		
		Using multimeter (ampere meter), open and measure pin 85. Hydraulic trailer brake released.	1.5 ADC	-	-

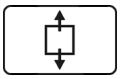
NOTE: *see §19*

33 A050 ECU, basic control unit (area: Autoguide "auto steering assist system")

A050 ECU, basic control unit
X1402 Separation point (58-pin)
X1403 Separation point (96-pin)



On right mudguard.



Remove panel.



Fig. 85. I001030

Connecting the **A059 Autoguide terminal**

NOTE: *Connection and testing the A059 Autoguide terminal, see:*
Chapter 9000 Reg. E – Measuring and testing A059 Autoguide terminal.



Fig. 86. I001366

Fit **Autoguide TopDock** (satellite receiver unit and gyrocompass) and connect X1633 separation point.



On cab ceiling.

NOTE: *See also:*
Chapter 9000 Reg. E – Measuring and testing Autoguide TopDock.

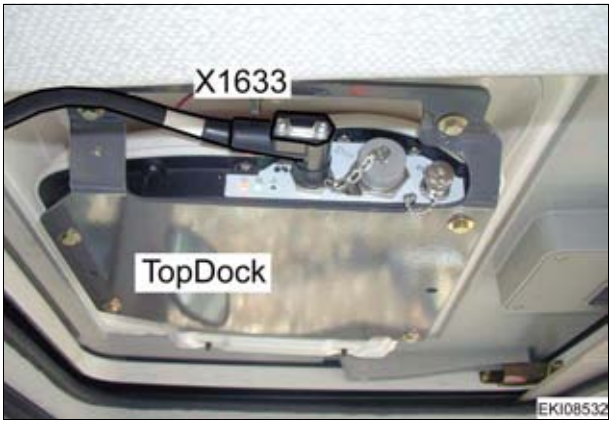


Fig. 87. I002345

Using the Autoguide system

NOTE: *See also: Autoguide quick guide.*

A Switch on the Autoguide system (standby mode)
Press button A = **LED flashes** = max. possible travel speed / GPS satellite search
Briefly press button A = **LED lights up** = max. travel speed restricted to 25 Km/h/search is made for satellites/"Auto-Guide" automatic track guidance (button B) is possible
Press and hold button A = standby mode OFF (LED goes out)

B Switch on automatic track guide (Steering Assist)

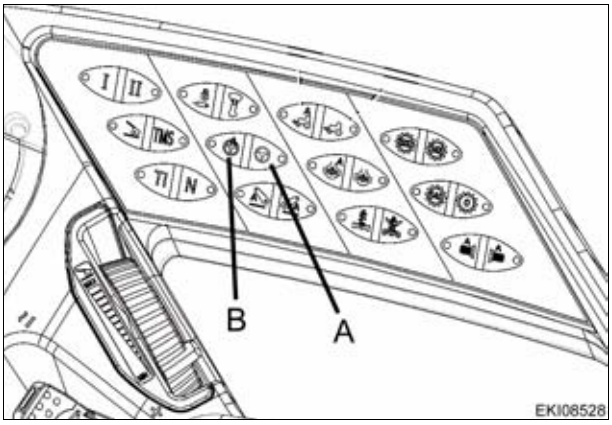


Fig. 88. I002339

Switch on the Autoguide system, the A059 Autoguide terminal will display:
Status bar indicator in the Autoguide terminal (arrow)
The status bar indicator shows:
Current GPS signal strength
Receipt of the patch



Fig. 89. I001366

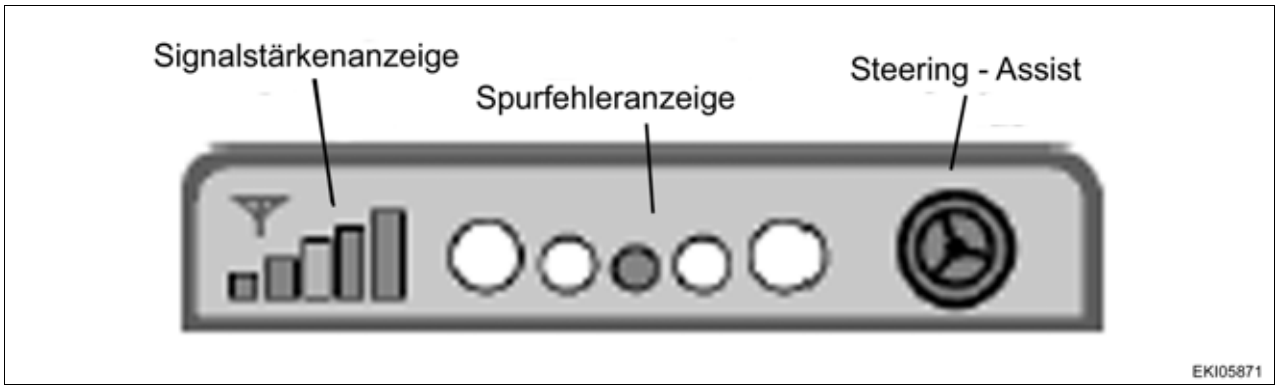


Fig. 90. I001367

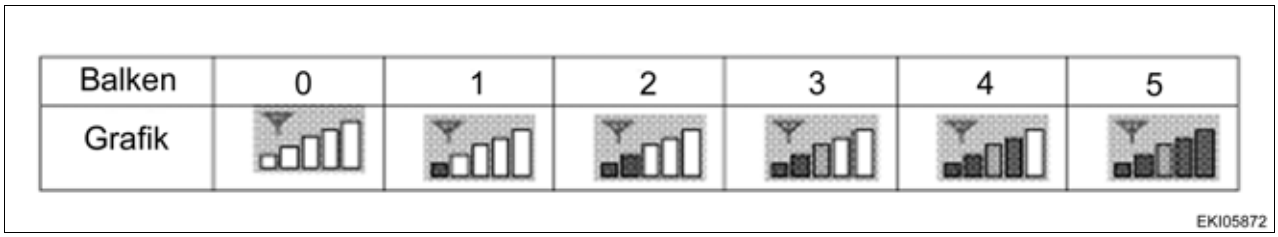


Fig. 91. I001368

Bars	0	1	2	3	4	5
Designation	No GPS signal	GPS signal available, but no patch (DGPS)	Patch available, but poor accuracy	adequate accuracy	good accuracy	best accuracy
Steering Assist (automatic track guide)	No	No	No	Yes	Yes	Yes

Three bars are required to operate Steering Assist (automatic track guide).
More bars indicate higher signal strength.
Two bars or less are not sufficient to operate Steering Assist (automatic track guide).

Press the Steering Assist button on the A059 Autoguide terminal.
The Steering Assist indicator on the Autoguide terminal is highlighted in **green.**
The tractor is now automatically guided along the path ("Autoguide")

NOTE: *Orange highlighting of the Steering Assist indicator means:*
The automatic track guide (Autoguide) has been engaged by the driver but not all necessary conditions have been fulfilled as yet.

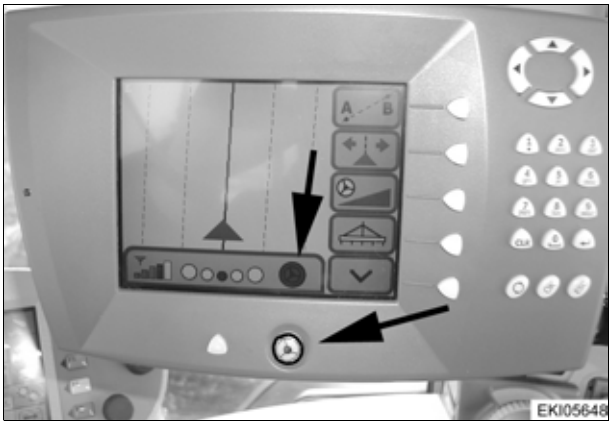


Fig. 92. I001369

Alternatively, Steering Assist (automatic track guide) can be engaged using button B on the A039 multifunction armrest.

NOTE: *In order for the tractor to be guided automatically along the path (Autoguide), various conditions for engagement must be met*

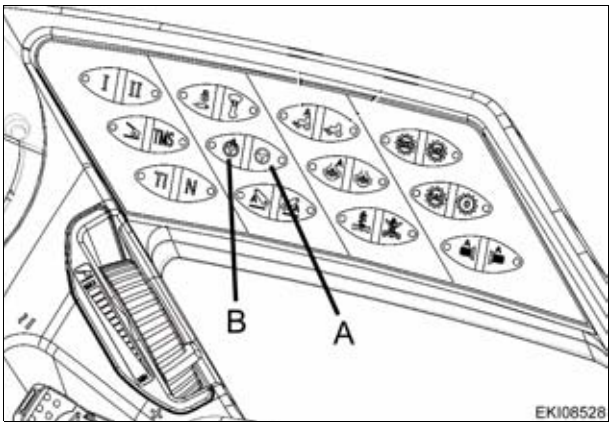


Fig. 93. I002339

Conditions for engaging Autoguide

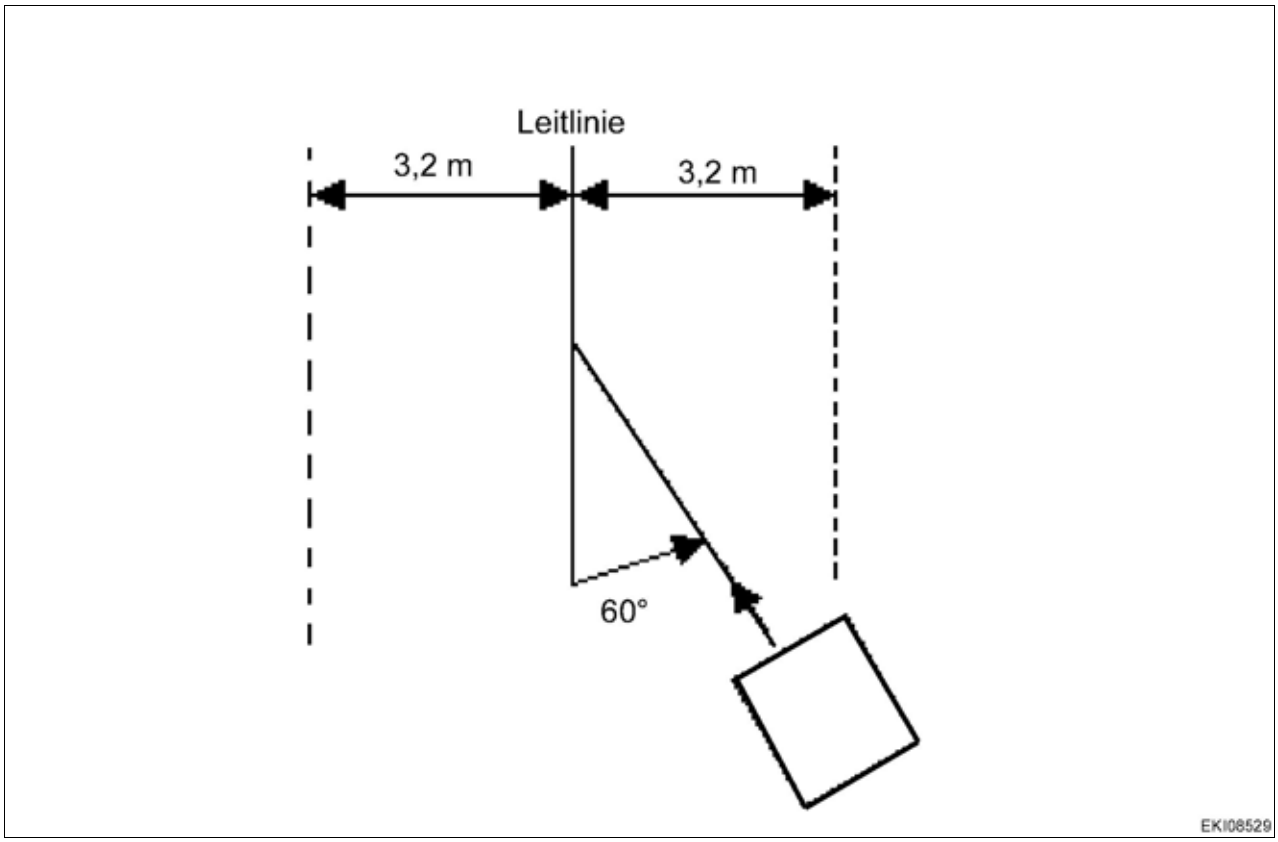


Fig. 94. I002340

Conditions	Limits for engagement
Angle to wayline	The approach angle in relation to the wayline is less than 60°.
Travel speed	The travel speed is greater than 0,4 Km/h and less than 15 Km/h **Note:** After automatic steering has engaged, the travel speed can be increased to 25 Km/h
Cross track	The cross track must be less than 3.2 m on either side of the wayline.
GPS position signal and Correction signal (OmniStar or basic station)	The signal strength must display a minimum of 3 bars. More bars indicate higher signal strength.

Autoguide disengages if:

- The tractor steering wheel is moved. The **B081 steering wheel sensor** deactivates Steering Assist (automatic steering).
- The direction of travel is changed.
- The GPS signal strength is less than 3 bars.
- The Fendt terminal is not changed to ISO bus.
- The connection between the Autoguide electronic boxes is interrupted.

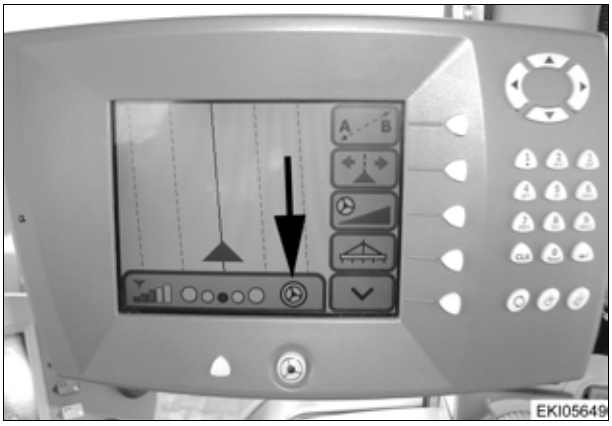


Fig. 95. I001371

Diagram: Autoguide system (FENDT 900 Vario COM III)

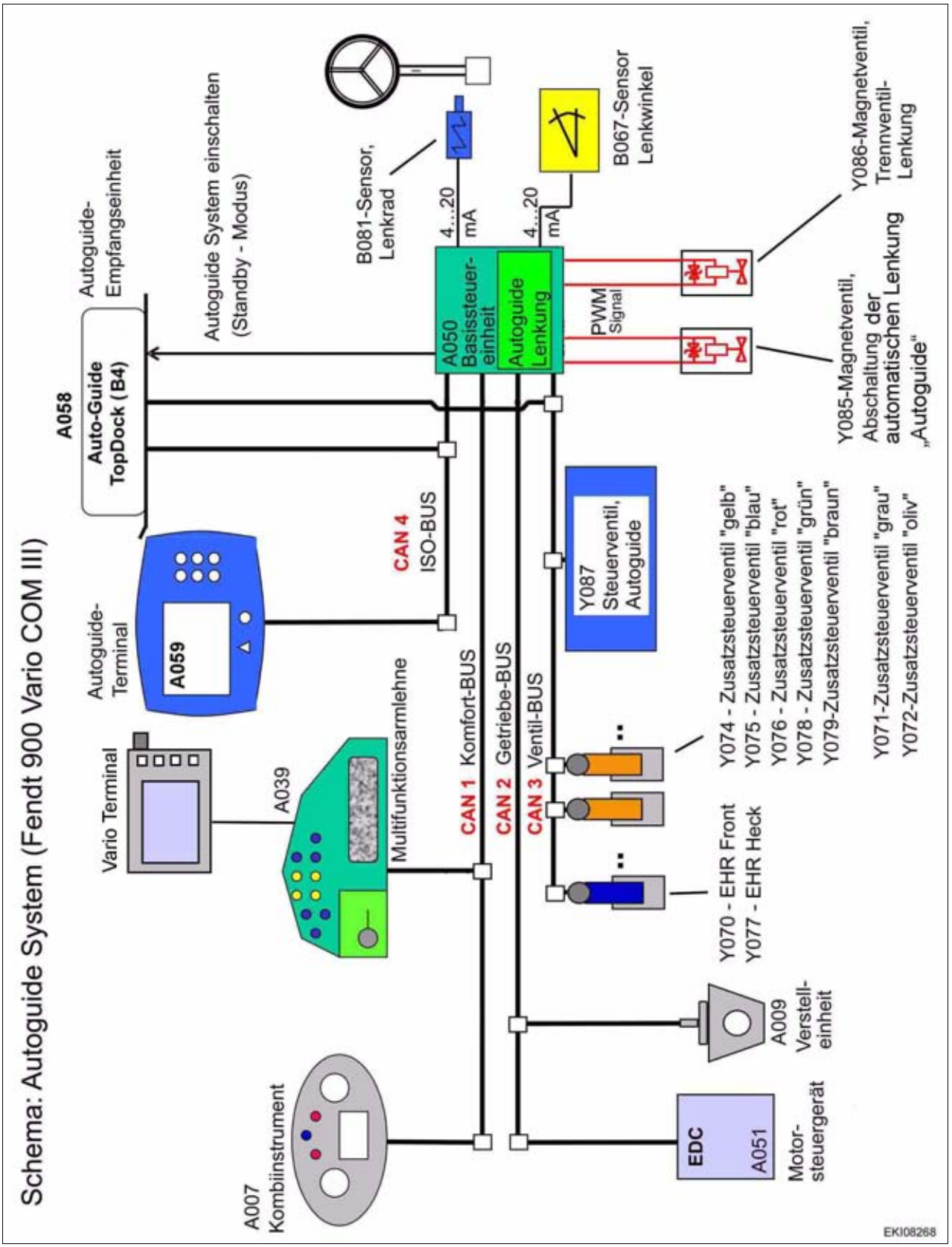


Fig. 96. I002162

919 .. 0101-1000
919 .. 1001-
922 .. 0101-1000
922 .. 1001-
925 .. 0101-1000
925 .. 1001-
928 .. 0101-1000
928 .. 1001-
931 .. 0101-1000
931 .. 1001-
934 .. 0101-1000
934 .. 1001-

Circuit diagram: Autoguide "auto steering assist system"

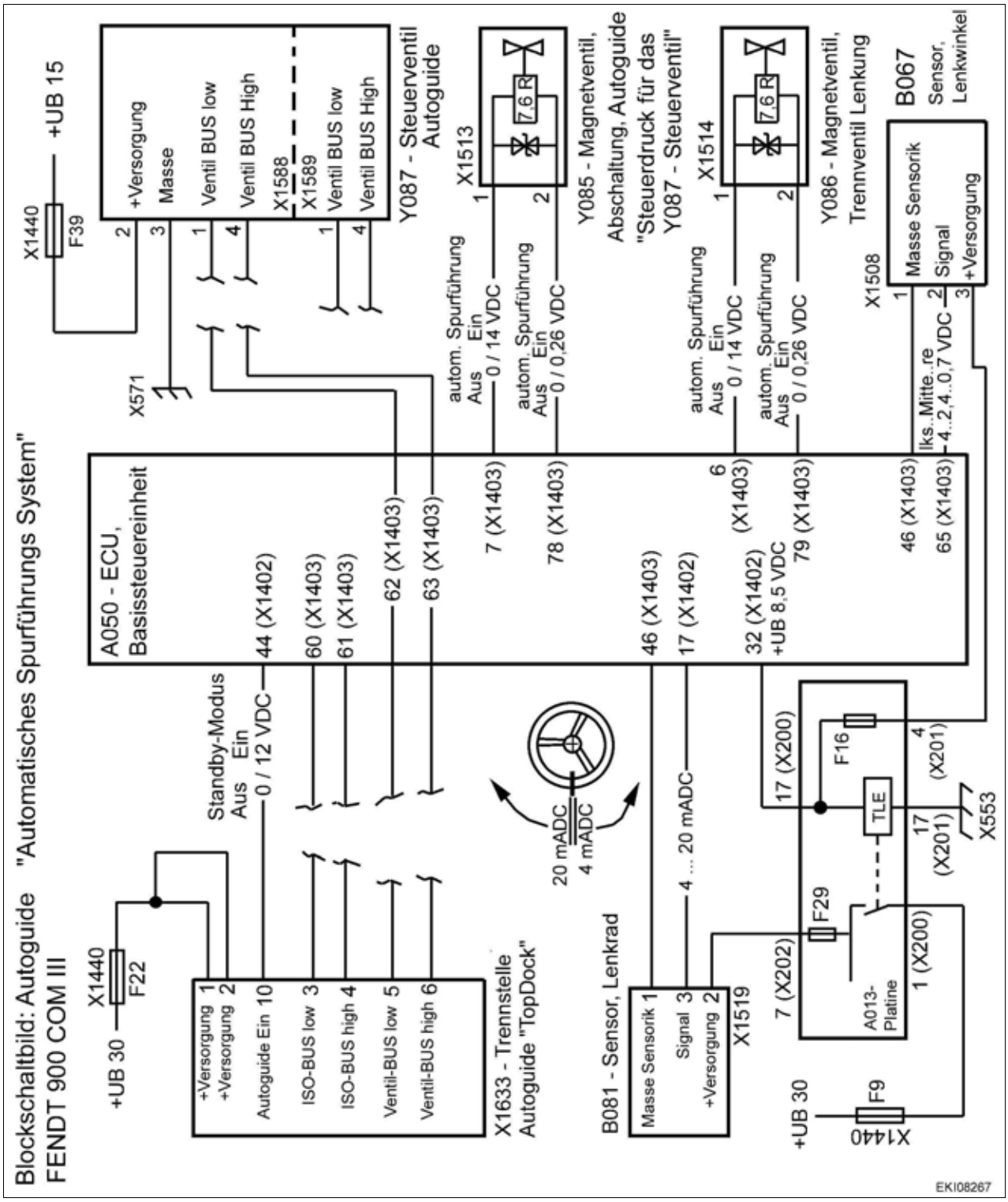


Fig. 97. I002342

Separation point on the A050 ECU, basic control unit	
Pin	**Function**
X1402	Separation point (58-pin)
X1403	Separation point (96-pin)



Fig. 98. I001668

Assignment on X899.980.304.000 adapter box
Connect the X899.980.304.000 adapter box and the X899.980.304.201 adapter cable to the A050 ECU, basic control unit and measure the pins (see table).

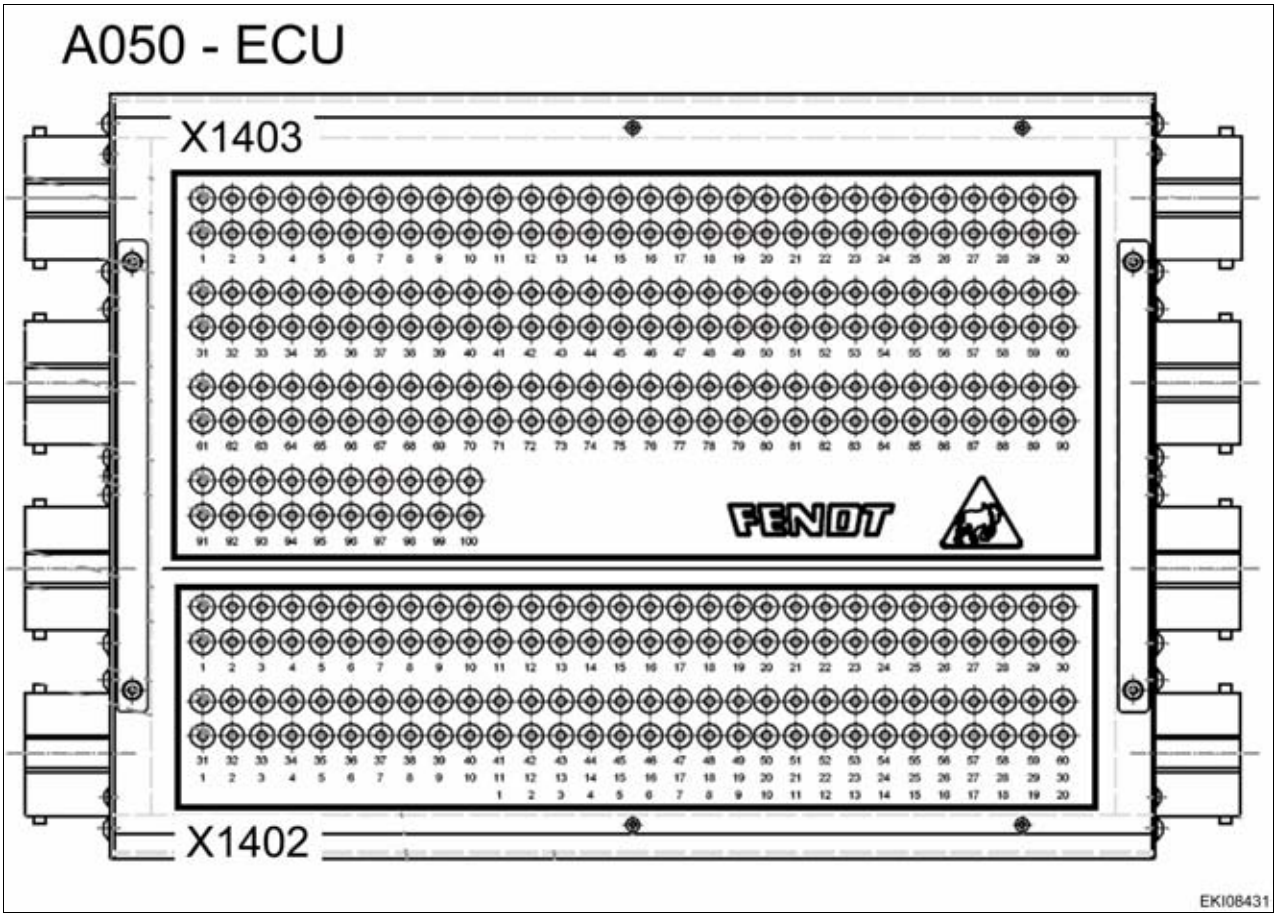


Fig. 99. I001874

Pin assignment and signal values on the A050 ECU, basic control unit

A050 ECU, basic control unit					
Pin 22 (electronics earth) at the X1403 separation point					
Pin	**Description**	**Signal type/condition**	**Signal**	**Signal from A050 ECU (break in wiring)**	**Signal from component (break in wiring)**
B067 sensor, steering angle					
32 (at X1402)	**+ supply** Ignition ON.	+UB 8.5 VDC	8.5 VDC	8.5 VDC	0 VDC
65 (on X1403)	Signal	Turn the steering wheel to left steering stop	4.0 VDC (approx. 19 mADC)	0 VDC	6.7 VDC
(Current input)		Bring steering wheel to centre position **Note:** Set the wheels straight and advance the tractor slowly, the steering wheel will find the centre position.	2.4 VDC (approx. 12 mADC)		
		Turn the steering wheel to right steering stop	0.7 VDC (approx. 3.6 mADC)		
B081 steering wheel sensor (360°)					
	+ supply				
		from the A013 PCB_Fuse (microfuse F29)	12 VDC		
17 (X1402)	Signal, steering wheel				
(Current input)		Slowly turn steering wheel to the left (360°) (power consumption increases)	4 to 20 mADC	0 VDC	5.7 VDC
		Slowly turn steering wheel to the right (360°) (power consumption decreases)	20 to 4 mADC		
X1633 separation point (Autoguide "TopDock")					
44 (X1402)	Switch on the Autoguide system (standby switch)				
(digital output)		Autoguide system OFF	0 VDC	0 VDC	0 VDC
		Switch on the Autoguide system (standby mode)	12 VDC	12 VDC	0 VDC
Y085 solenoid valve, automatic track guide "Autoguide" switch-off (resistance = 7.6 ohms)					
7 (X1403)	Actuation (high signal) Ignition ON. Engine is running				

A050 ECU, basic control unit					
Pin 22 (electronics earth) at the X1403 separation point					
Pin	**Description**	**Signal type/condition**	**Signal**	**Signal from A050 ECU (break in wiring)**	**Signal from component (break in wiring)**
(PWM signal)		Switch on Steering Assist (automatic track guide).	14 VDC	0 VDC	0 VDC
		Turn steering wheel to switch off Steering Assist "automatic track guide".	0 VDC		
78 (X1403)	Virtual earth (low signal)	Switch on Steering Assist (automatic track guide).	approx. 0.26 VDC		
(PWM signal)		Turn steering wheel to switch off Steering Assist "automatic track guide".	0 VDC		
		Using multimeter (ampere meter), open and measure pin 7 (at X1403). Switch on Steering Assist (automatic track guide).	approx. 1.6 ADC	-	-
Y086 steering block valve solenoid valve (resistance = 7.6 ohms)					
6 (X1403)	Actuation (high signal) Ignition ON. Engine is running				
(PWM signal)		Switch on Steering Assist	14 VDC	0 VDC	0 VDC
		Turn steering wheel to switch off Steering Assist	0 VDC		
79 (X1403)	Virtual earth (low signal)	Switch on Steering Assist	0.28 VDC		
(PWM signal)		Turn steering wheel to switch off Steering Assist	0 VDC		
		Using multimeter (ampere meter), open and measure pin 6 (at X1403). Switch on Steering Assist (automatic track guide).	approx. 1.6 ADC	-	-

5 Checking the A050 ECU, basic control unit

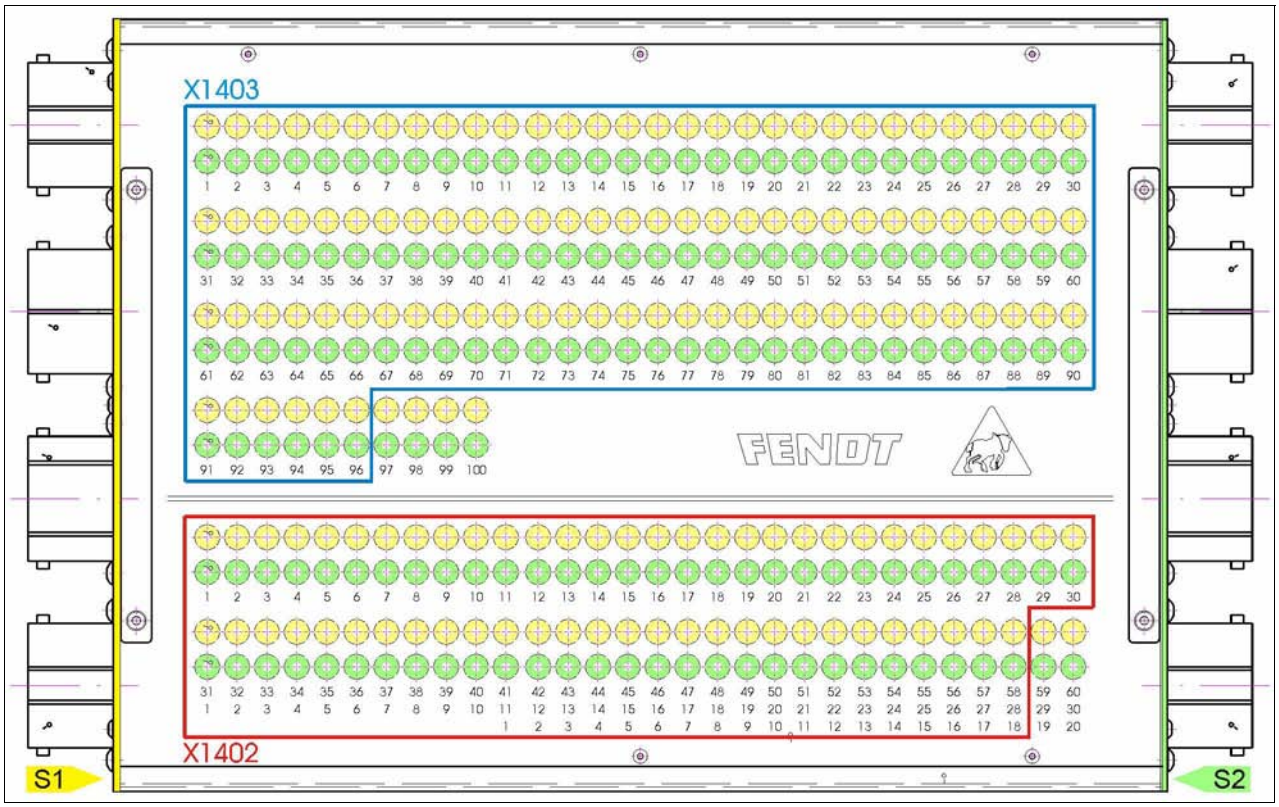


Fig. 13. I007438

Adapter cable X899.980.304.201 for connection to **A050** - ECU, basic control unit

Left front end (S1)
YELLOW adapter cable connection
(Measurement: cabling to component)

Right front end (S2)
GREEN adapter cable connection
(Measurement: to electronics box)

NOTE: *Check the connector coding when connecting the adapter cable.*

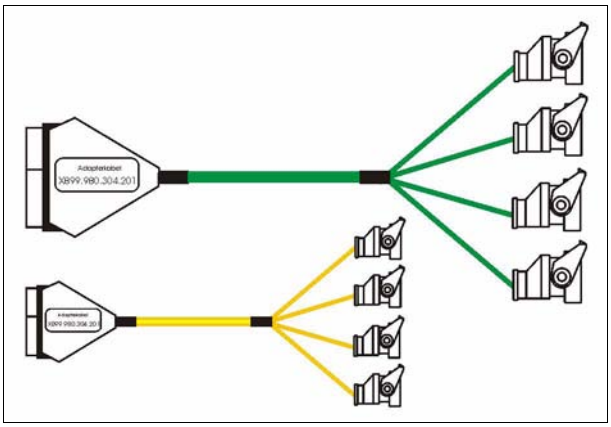


Fig. 14. I007447

IMPORTANT: *Check the adapter box pin range*

X1403 = pins 1-96
See the adapter box measuring range outlined in **BLUE** — pin designation **AXX** on the wiring diagram and in the Vario diagnostics

X1402 = pins 1-58
See the adapter box measuring range outlined in **RED** — pin designation **BXX** on the wiring diagram and in the Vario diagnostics

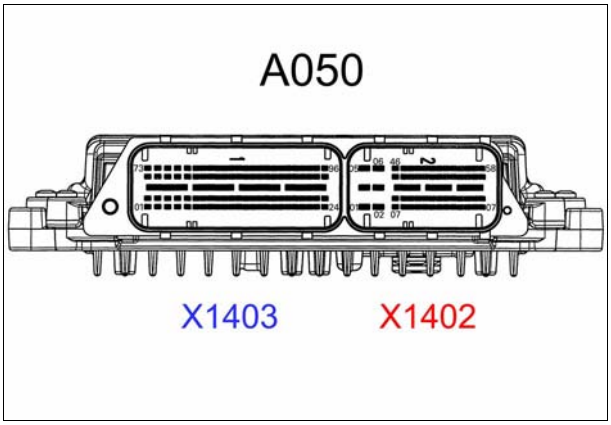


Fig. 15. I007431

NOTE: *see also §7, Page 8 "Various measurement possibilities using the adapter box (160-pin)"*

35 A051 ECU, EDC engine control unit (pin assignment)



Fig. 101. I003564



Fig. 102. I003565



Fig. 103. I003566

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36 A051 ECU, EDC engine control unit, "Engine controller"

Circuit diagram: **A051** - ECU, engine control unit (EDC 7).

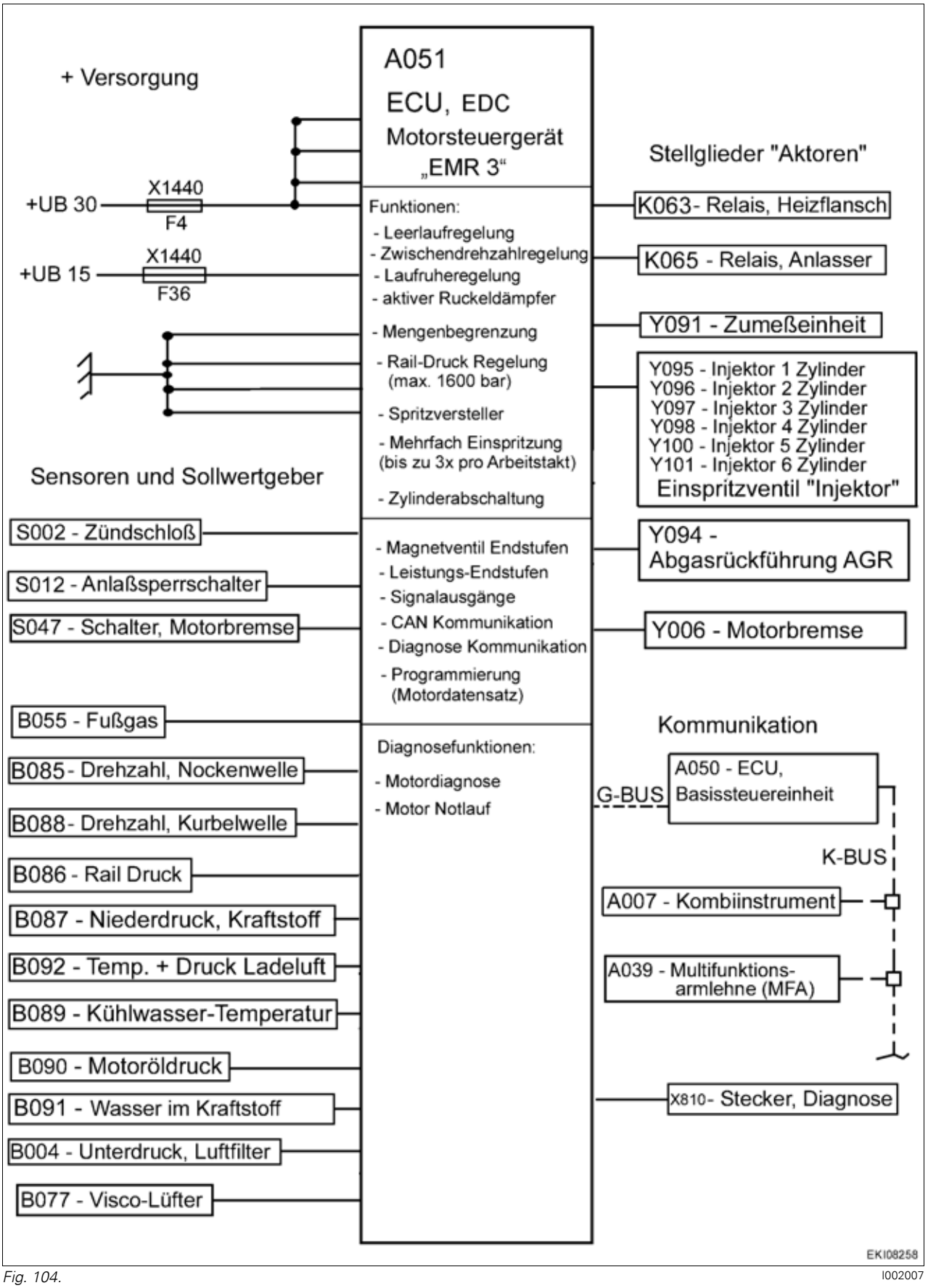


Fig. 104. I002007

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.202 adapter cable to the **A051** - ECU, engine control unit (EDC 7). and measure the pins (see table).* *see §37*

Measuring the supply voltage for the A051 ECU, EDC engine control unit

X1466 - Separation point on A051				
+ UB 30 (battery voltage)				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
+ supply	2			Fuse F4 in X1440 fuse holder or in wiring set see also circuit diagram: supply to electronics
	3			
	8			
	9			
		12 VDC	Engine OFF, ignition OFF	
		Approx. 13-14 VDC	Engine is running	
Electronics earth	5			
	6			
	10			
	11			
+ supply	2			
	3			
	8			
	9	Voltage drop max. 1 VDC from last reading	Also connect approx. 55 W bulb	Voltage must remain stable even under load. If the voltage drop is greater than approx. 1 VDC, remove contact resistors (e.g. at fuse).
Electronics earth	5			
	6			
	10			
	11			

X1466 - Separation point on A051				
+ UB 15 (switched voltage, ignition switch)				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
+ supply	40			Fuse F36 in X1440 fuse holder or in wiring set see also circuit diagram: supply to electronics
		12 VDC	Engine OFF, ignition ON	
		Approx. 13-14 VDC	Engine is running	
Electronics earth	5			
	6			
	10			
	11			
+ supply	40			

X1466 - Separation point on A051				
+ UB 15 (switched voltage, ignition switch)				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
		Voltage drop max. 1 VDC from last reading	Also connect approx. 55 W bulb	Voltage must remain stable even under load. If the voltage drop is greater than approx. 1 VDC, remove contact resistors (e.g. at fuse).
Electronics earth	5			
	6			
	10			
	11			

NOTE: *If voltage drop is greater than approx. 1 VDC, remove contact resistors (e.g. at fuse).*

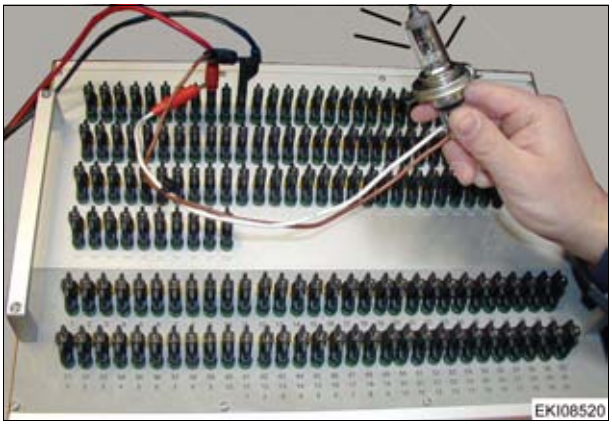


Fig. 105. I002216

Signal voltages at **X1466** - Separation point on A051

X1466 - Separation point on A051					
Pin	**description**	**Signal type/condition**	**Signal**	**Wire interrupted**	
				Signal from ECU	**Signal from compo-nent**
+ supply and earth					
2	+ supply (+ UB 30)	Ignition OFF	12 VDC	12 VDC	12 VDC
3	+ supply (+ UB 30)	Ignition OFF	12 VDC	12 VDC	12 VDC
5	Earth	-	-	-	-
6	Earth	-	-	-	-
8	+ supply (+ UB 30)	-	-	-	-
9	+ supply (+ UB 30)	-	12 VDC	12 VDC	12 VDC
10	Earth	-	-	-	-
11	Earth	-	-	-	-
40	+ supply (+ UB 15)	Ignition OFF	0 VDC	0 VDC	0 VDC
		Ignition ON.	12 VDC	12 VDC	12 VDC
B004 - Vacuum switch (air filter)					
21	+ supply to sensors	Ignition OFF	0 VDC	0 VDC	0 VDC

X1466 - Separation point on A051					
Pin	**description**	**Signal type/condition**	**Signal**	**Wire interrupted**	
				Signal from ECU	**Signal from component**
		Ignition ON.	12 VDC	12 VDC	0 VDC
42	Signal	Vacuum less than approx 65 mbar (switch open)	0 VDC	0 VDC	0 VDC
		Vacuum greater than approx. 65 mbar (switch closed) --> warning beep and warning message	12 VDC	0 VDC	12 VDC
B055 - Sensor, foot throttle ***see §31*****Note**					
77	+UB 5.0 VDC for B055	Ignition OFF	0 VDC	0 VDC	0 VDC
		Ignition ON.	5.0 VDC	5.0 VDC	0.11 VDC
78	B055 earth		-	-	-
79	Signal at B055	Throttle pedal not actuated	0.6 VDC	0 VDC	0.6 VDC
		Throttle pedal actuated	4.16 VDC	0 VDC	4.16 VDC
B077 - Engine fan (speed sensor/magnetic clutch)					
14	Magnetic clutch on fan (terminal 86) "inductive input"	Viscous fan in idle	Approx. 14 VDC	12 VDC	approx. 3.5 VDC
		Viscous fan switched on	Approx. 4.5 VDC		
15	Magnetic clutch on fan (terminal 85) "inductive output"	Viscous fan in idle	Approx. 14 VDC	approx. 3.5 VDC	12 VDC
		Viscous fan switched on	Approx. 4.5 VDC		
67	Fan earth				
68	+ UB fan	Ignition OFF	0 VDC	0 VDC	0 VDC
		Ignition ON.	5.0 VDC	5.0 VDC	0 VDC
69	Signal, fan (speed sensor)	Engine OFF, viscous fan stationary	5.0 VDC	5.0 VDC	0 VDC
		Engine running, viscous fan rotating	approx. 2.8 VDC (irrespective of fan speed)		

X1466 - Separation point on A051					
Pin	**description**	**Signal type/condition**	**Signal**	**Wire interrupted**	
				Signal from ECU	**Signal from component**
Transmission bus (G bus)					
34	G bus low	Ignition off, resistance between pins 34 and 35 and wiring harness measured	approx. 60 ohms (2 x 120 ohms connected in parallel)		
35	G bus high				
K065 - Starter relay **Note:** disconnect X1671 separation point on A051 ECU, EDC engine control unit. When the X1671 separation point is disconnected, the A051 ECU, EDC engine control unit detects no engine speed, which prevents the engine from starting. **Note:** If, after approx. 4 seconds the A051 ECU, EDC engine control unit detects no engine speed, the start operation is interrupted					
17	Relay (terminal 86) "inductive input"	Ignition ON.	3.5 VDC	3.5 VDC	0 VDC
		S002 ignition switch to position 2 (terminal 50a) "Start"	12 VDC briefly, then 3.5 VDC	3.5 VDC	12 VDC briefly, then approx. 0.15 VDC
37	Relay (terminal 85) "inductive output"	Ignition ON.	3.5 VDC	0.15 VDC	3.5 VDC
		S002 ignition switch to position 2 (terminal 50a) "Start"	12 VDC briefly, then 3.5 VDC	12 VDC briefly, then 0 VDC	0 VDC
S002 - Switch, ignition Note: Open pin 17 (K065 starter relay) at the X1466 separation point. This prevents the engine from starting.					
74	Ignition (terminal 50a) "Start"	Clutch pedal depressed, set ignition to Pos. 2 (50a)	12 VDC	0 VDC	12 VDC
S012 - Switch, starter lockout					
21	+ supply to sensors	Ignition OFF	0 VDC	0 VDC	0 VDC
		Ignition ON.	12 VDC	12 VDC	0 VDC
66	Signal Starter lockout	Clutch pedal not depressed (switch open)	0 VDC	0 VDC	0 VDC
		Completely depress clutch pedal (switch closed)	12 VDC	0 VDC	12 VDC

X1466 - Separation point on A051					
Pin	**description**	**Signal type/condition**	**Signal**	**Wire interrupted**	
				Signal from ECU	**Signal from component**
S034 - Switch, coolant level					
55	Signal, coolant level	Coolant level OK (Float at top) (switch closed 160 ohms)	Approx. 0.45 VDC	Approx. 10.3 VDC	0 VDC
		Coolant level too low (Float at bottom) (switch open)	Approx. 10.3 VDC		
29	Electronics earth				
S047 - Switch, engine brake **See also: Y006 solenoid valve, engine brake**					
21	+ supply to sensors	Ignition OFF	0 VDC	0 VDC	0 VDC
		Ignition ON.	12 VDC	12 VDC	0 VDC
47	Signal, engine brake	Engine brake not actuated (switch closed)	12 VDC	0 VDC	12 VDC
		Engine brake actuated (switch open)	0 VDC	0 VDC	0 VDC
X810 socket, diagnostics EDC (Deutz Serdia EMR 3 diagnostics program)					
89	Diagnostics				

Signal voltages at **X1671** - Separation point on A051

X1671 - Separation point on A051					
Pin	**description**	**Signal type/condition**	**Signal**	**Wire interrupted**	
				Signal from ECU	**Signal from component**
B085 - Camshaft speed sensor					
9	Signal, camshaft speed				
		800 rpm (idle speed)	1.85 VAC Approx. 46 Hz	0 VAC	Approx. 1.85 VAC
		1600 rpm	3.23 VAC Approx. 93 Hz	0 VAC	Approx. 3.23 VAC
		2200 rpm	4.01 VAC Approx. 129 Hz	0 VAC	Approx. 4.01 VAC

X1671 - Separation point on A051					
				Wire interrupted	
Pin	**description**	**Signal type/condition**	**Signal**	**Signal from ECU**	**Signal from compo-nent**
		2300 rpm (no-load speed)	4.18 VAC Approx. 137 Hz	0 VAC	Approx. 4.18 VAC
10	B085 earth				
B086 - Rail pressure sensor					
13	+supply for B086				
		Ignition OFF	0 VDC	0 VDC	0 VDC
		Ignition ON.	5.0 VDC	5.0 VDC	0 VDC
14	Signal at B086				
	Note: measurement values refer to a diesel engine not under load	Ignition ON, engine stationary = 0 bar	Approx. 0.5 VDC	5.0 VDC	0.5/approx. 2.1 VDC (engine running)
		800 rpm = 400 bar	Approx. 1.37 VDC		
		1600 rpm = 700 bar	Approx. 2.02 VDC		
		2200 rpm = 800 bar	Approx. 2.24 VDC		
12	B086 earth				
B087 - Fuel low pressure sensor					
16	+ supply for B087 sensor, fuel low pressure				
		Ignition OFF	0 VDC	0 VDC	0 VDC
		Ignition ON.	5.0 VDC	5.0 VDC	0 VDC
22	Signal on the B087 sensor, fuel low pressure				
		Idle (800 rpm) (approx. 6 bar fuel pressure)	Approx. 3.8 VDC	0 VDC	Approx. 3.8 VDC
18	B087 earth				
B088 - Crankshaft speed sensor					
23	Signal, crankshaft speed				
		800 rpm (idle speed)	20 VAC 770 Hz	0 VAC	Approx. 20 VAC
		1600 rpm	28.3 VAC 1.54 KHz	0 VAC	Approx. 28.3 VAC
		2200 rpm	31.0 VAC 2.12 KHz	0 VAC	Approx. 31.0 VAC
		2300 rpm (no-load speed)	31.3 VAC 2.23 KHz	0 VAC	Approx. 31.3 VAC
19	B088 earth				

X1671 - Separation point on A051					
				Wire interrupted	
Pin	**description**	**Signal type/condition**	**Signal**	**Signal from ECU**	**Signal from component**
B089 - Engine temperature sensor (Deutz) **Note:** The B089 coolant temperature is used for: - Coolant water temperature display on A007 instrument panel - Actuating R002 heater flange (via K063 relay, heater flange) (engage temperature for the heater flange = less than 5°C)					
15	Signal				
		Coolant temperature = 0°C	5.9 Kohms		
		Coolant temperature = 5°C	4.7 Kohms		
		Coolant temperature = 20°C	2.5 Kohms		
		Coolant temperature = 110°C "red zone"	140 ohms		
26	B089 earth				
B090 - Sensor, oil pressure					
32	+supply for B090				
		Ignition OFF	0 VDC	0 VDC	0 VDC
		Ignition ON.	5.0 VDC	5.0 VDC	0 VDC
27	Signal, engine oil pressure				
		at approx. 4 bar engine oil pressure	2.0 VDC	5.4 VDC	2.0 VDC
		at approx. 2 bar engine oil pressure	1.0 VDC	5.4 VDC	2.0 VDC
		at approx. 1 bar engine oil pressure	0.5 VDC	5.4 VDC	2.0 VDC
24	B090 earth				
B091 - Sensor, water in fuel					
28	Signal, water in the fuel				
		Water level OK (switch open)			
		Water level tool high (switch closed)			
24	B091 earth				
B092 - Sensor, charge air pressure/temperature					
33	+supply for B092				
		Ignition OFF	0 VDC	0 VDC	0 VDC
		Ignition ON.	5.0 VDC	5.0 VDC	0 VDC
34	Signal, boost pressure				
		Idle (800 rpm), Diesel engine not under load	Approx. 1.0 VDC	4.8 VDC	0 VDC

X1671 - Separation point on A051					
				Wire interrupted	
Pin	**description**	**Signal type/condition**	**Signal**	**Signal from ECU**	**Signal from component**
		No-load engine speed (2200 rpm) Diesel engine not under load	Approx. 1.6 VDC		
36	Signal, charge air temperature				
		at approx. 20°C charge air temperature	2.5 Kohms		
		at approx. 90°C charge air temperature	250 ohms		
25	B092 earth				
K063 - Heater flange relay **Note:** - Actuating R002 heater flange (via K063 relay, heater flange) (engage temperature for the heater flange = less than 5°C)					
3	K063 relay (terminal 86) "inductive input"				
		Heater flange not active	0 VDC	0 VDC	0 VDC
		Heater flange active (Indicator lamp in A007 instrument panel lights up)	12 VDC	12 VDC	0 VDC
7	K063 relay (terminal 85) "inductive output"				
		Heater flange not active			
		Heater flange active (Indicator lamp in A007 instrument panel lights up)			
8	K063 relay (terminal 88a) "switchover voltage output" **Note:** The A051 ECU, EDC engine control unit detects at this pin that the heater flange is pre-heating				
		Heater flange not active			
		Heater flange active (Indicator lamp in A007 instrument panel lights up)			
Y006 - Solenoid valve, engine brake **See also: S047 switch, engine brake**					
3	+supply for Y006				
		Ignition OFF	0 VDC	0 VDC	0 VDC
		Ignition ON. Engine is running	14 VDC	14 VDC	approx. 2.8 VDC
6	Actuation, engine brake				
		Engine is running, Engine brake not activated	0 VDC	0 VDC	0 VDC

X1671 - Separation point on A051					
Pin	**description**	**Signal type/condition**	**Signal**	**Wire interrupted**	
				Signal from ECU	**Signal from component**
		Engine is running, Engine speed above 900 rpm Engine brake activated	0 to 14 VDC	0.5 to 3.3 VDC	0 VDC
Y094 - Actuator unit, AGR (exhaust gas recirculation)					
3	+supply for Y094				
		Ignition OFF	0 VDC	0 VDC	0 VDC
		Ignition ON.	12 VDC	12 VDC	0 VDC
11	Signal, exhaust gas recirculation				
	Note: The exhaust flap opening angle depends on the engine load.	1200 rpm	0.5 to 1.4 VDC	3.2 VDC	14 VDC
		1600 rpm	0.5 to 2.0 VDC		
		2000 rpm	0.5 to 2.7 VDC		
		2200 rpm	0.5 to 2.7 VDC		
5	Y094 earth				

Signal voltages at **X1672** - Separation point on A051

X1672 - Separation point on A051					
Pin	**description**	**Signal type/condition**	**Signal**	**Wire interrupted**	
				Signal from ECU	**Signal from component**
Y091 - Dispensing unit (fuel)					
9	Pin high	Resistance between pin 9 and pin 10	3.6 ohms		
10	Pin low				
Y095 - Injector valve 1 (injector)					
4	Injector 1, 2, 3 (high)	Resistance between pin 4 and pin 13	0.5 ohms		
13	Injector 1 (low)				
Y096 - Injector valve 2 (injector)					
4	Injector 1, 2, 3 (high)	Resistance between pin 4 and pin 12	0.5 ohms		
12	Injector 2 (low)				

X1672 - Separation point on A051					
Pin	**description**	**Signal type/condition**	**Signal**	**Wire interrupted**	
				Signal from ECU	**Signal from compo-nent**
Y097 - Injector valve 3 (injector)					
4	Injector 1, 2, 3 (high)	Resistance between pin 4 and pin 6	0.5 ohms		
6	Injector 3 (low)				
Y098 - Injector valve 4 (injector)					
3	Injector 4, 5, 6 (high)	Resistance between pin 3 and pin 16	0.5 ohms		
16	Injector 4 (low)				
Y100 - Injector valve 5 (injector)					
3	Injector 4, 5, 6 (high)	Resistance between pin 3 and pin 15	0.5 ohms		
15	Injector 5 (low)				
Y101 - Injector valve 6 (injector)					
3	Injector 4, 5, 6 (high)	Resistance between pin 3 and pin 14	0.5 ohms		
14	Injector 6 (low)				

Signal current at injector "injector valve"		
Note: engine without load		
Pin at X1672 - Separation point on A051	**Injection "injector valve"**	**Target value (approximate values)**
4 and 13	Y095 injector 1 (on flywheel)	800 rpm = approx. 50 mVDC
4 and 12	Y096 injector 2	1200 rpm = approx. 67 mVDC
4 and 6	Y097 injector 3	1600 rpm = approx. 80 mVDC
3 and 16	Y098 injector 4	2000 rpm = approx. 95 mVDC
3 and 15	Y100 injector 5	2200 rpm = approx. 100 mVDC
3 and 14	Y101 injector 6	

Signal voltage at Y091 - Dispensing unit (fuel)		
Note: engine without load		
Pin at X1672 - Separation point on A051	**Switch position**	**Target value (approximate values)**
9 and 10	Ignition ON, engine OFF	1.8 VDC briefly, then 0 VDC
	Engine running (without load)	approx. 4.3 VDC (irrespective of engine speed)

6 Checking the A051 ECU, engine control unit (EDC 7)

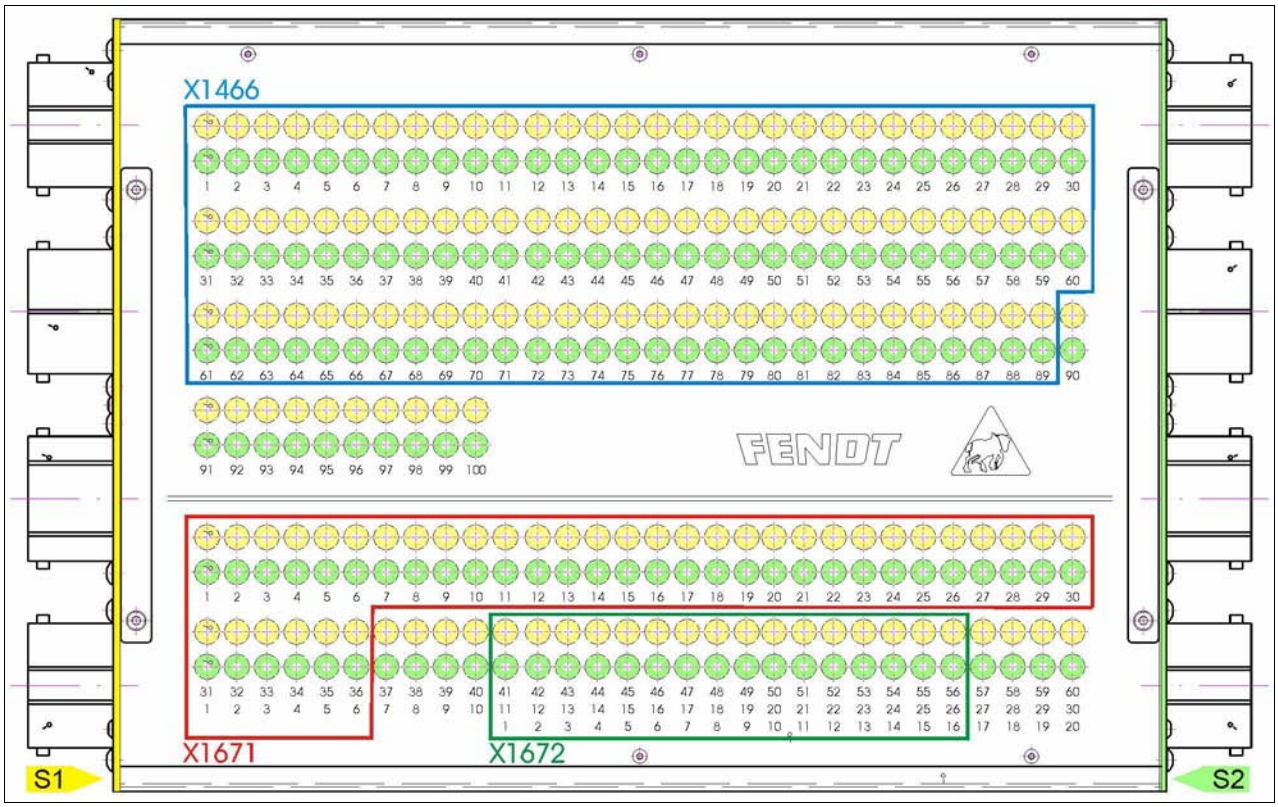


Fig. 16. I007496

Adapter cable X899.980.304.202 for connection to **A051** - ECU, engine control unit (EDC 7).

Left front end (S1)
YELLOW adapter cable connection
(Measurement: cabling to component)

Right front end (S2)
GREEN adapter cable connection
(Measurement: to electronics box)

NOTE: *Check the connector coding when connecting the adapter cable.*

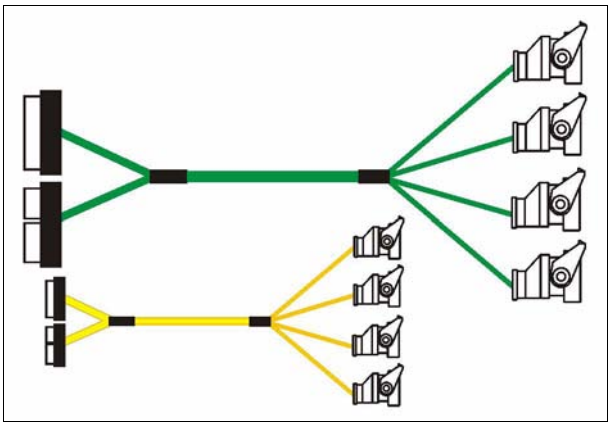


Fig. 17. I007497

IMPORTANT: *Check the adapter box pin range*

X1466 = pins 1-89
See the adapter box measuring range area outlined in **BLUE**.

X1671 = pins 1-36
See the adapter box measuring range area outlined in **RED**.

X1672 = pins 1-16
See the adapter box measuring range area outlined in **GREEN**.

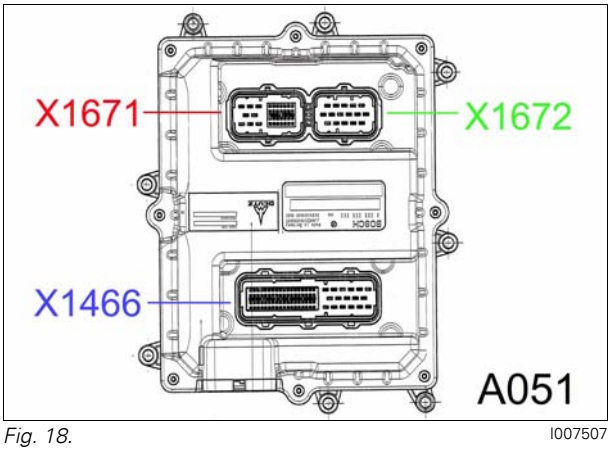


Fig. 18. I007507

NOTE: *see also §7, Page 8 "Various measurement possibilities using the adapter box (160-pin)"*

38 A053 air conditioning unit (stepless fan)

Circuit diagram: fan (continuous)

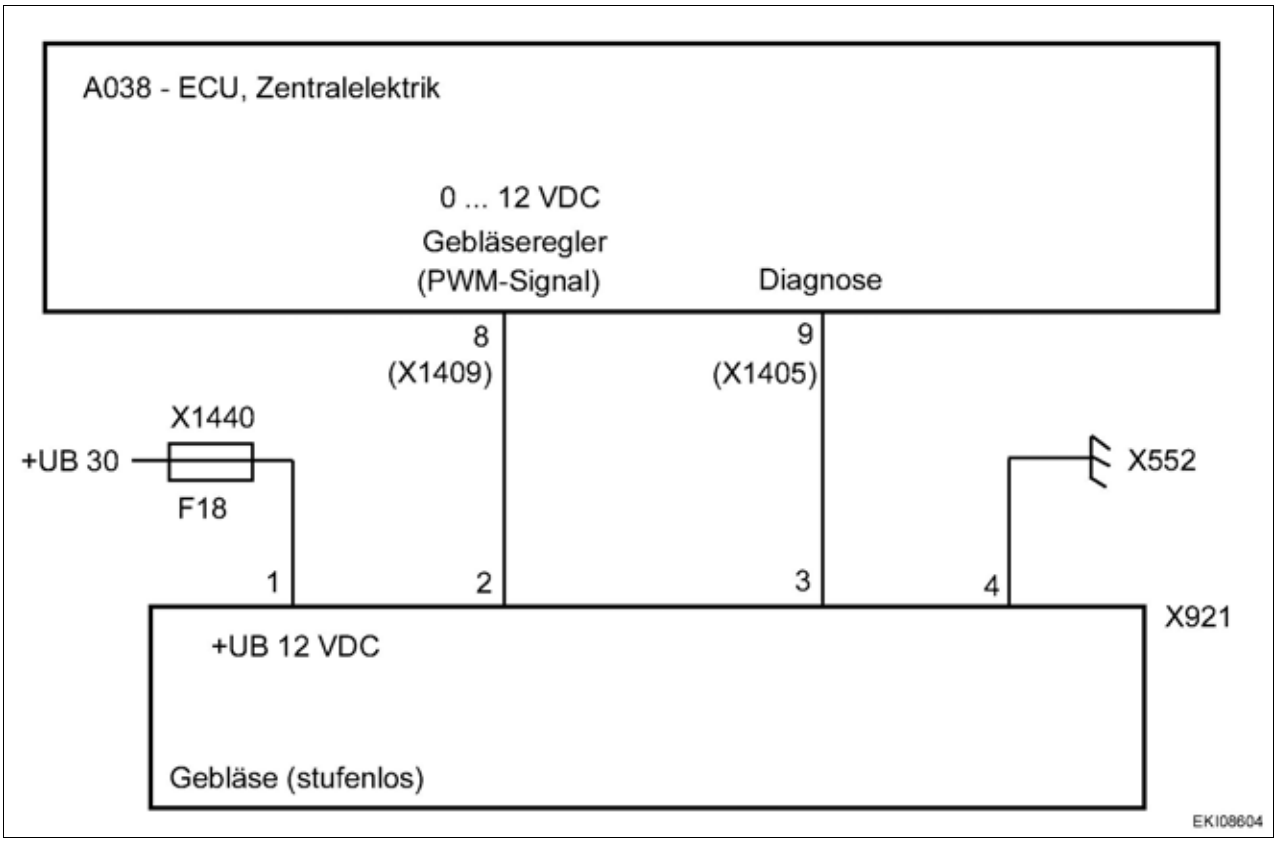


Fig. 107. I002406

Item	Designation	Note
A038 - ECU, central electrical system		
8 (on X1409)	Fan governor (0 to 12 VDC)	
9 (on X1405)	Diagnostics	
Fan (continuous) **X921 separation point**		
1	+UB 12 VDC	Fuse F18 (X1440)
2	Fan governor (0 to 12 VDC)	
3	Diagnostics	
4	Earth	
X552 earth pin		

Measuring points and signal values

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see §16*

Prerequisite for this measurement:

- Switch on ignition.
- Use the **vehicle earth** to **earth**

Checking the fan governor and diagnostics

Pin	description	Signal type/condition	Signal
Checking the fan governor voltage			
F8 (X1409)	Fan governor signal	Ignition OFF	0 VDC
		Ignition on - depending on the set fan speed from **0–12 VDC**	
Diagnostics voltage			
B9 (X1405)	Fan diagnostics signal	Fan OK – not loadable	3.2 VDC
		Fan faulty	0 VDC

Testing power consumption on fan (continuous)

Draw out **fuse F18** on X1440 fuse holder.
Connect multimeter (ampere meter).

NOTE: *Set measurement range on multimeter. Connect adapter cable with floating fuse (in-house production)*

	Power consumption (ADC)
Min. speed	approx. 0.7 ADC
Max. speed	approx. 16.5 ADC

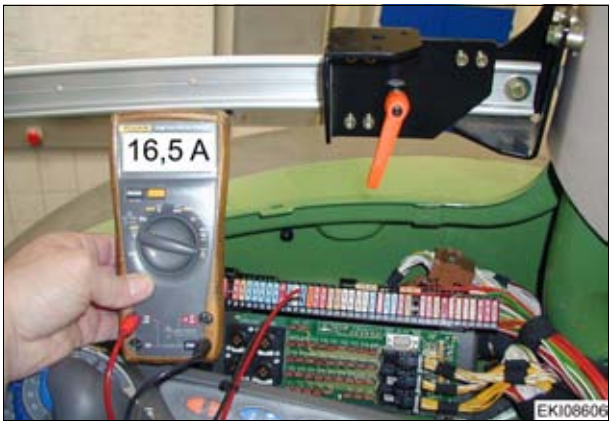


Fig. 108. I002408

NOTE: *see §1*
see §2

39 A053 air conditioning unit (sensor, evaporator)

Circuit diagram: evaporator sensor

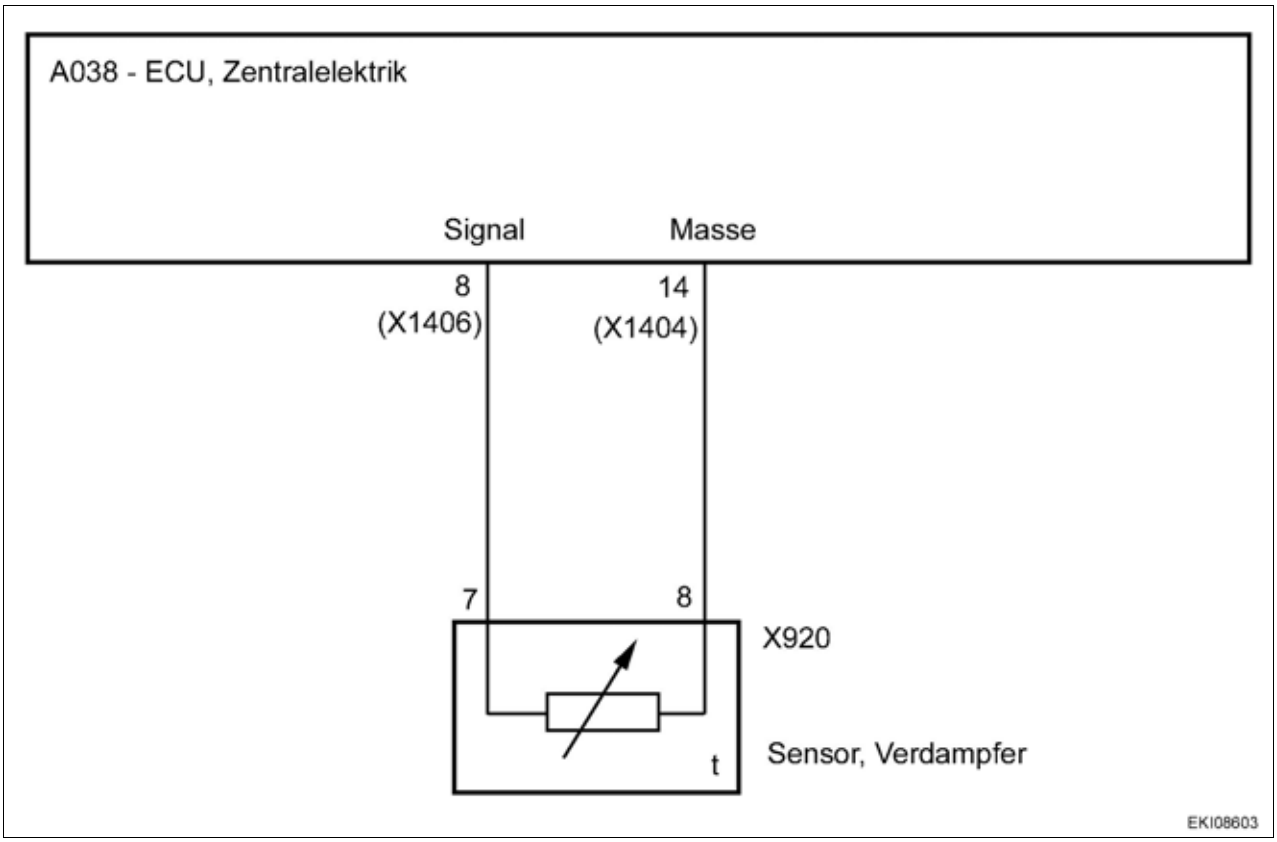


Fig. 109. I002405

Item	Designation	Note
A038 - ECU, central electrical system		
8 (on X1406)	Signal	
14 (on X1404)	Earth	
Evaporator sensor		
X920	Separation point	
7	Signal	
8	Earth	

Measuring points and signal values

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see §16*

Prerequisite for this measurement:

– Switch on ignition.
– Use the **vehicle earth** to **earth**

Measuring resistance (ohm) and voltage (VDC)

Pin	Pin description	Signal type/condition	Signal	Wire interrupted	
				Signal from A038 ECU	Signal from compo-nent
A053 - ECU, air conditioning control					
C8 (X1406)	**Sensor, evaporator tempera-ture** **Note:** Read sensor temperature from FENDIAS diagnosis.				
	- 20 °C	approx. 64 Kohms	3.0 VDC	4.2 VDC not loadable	0 VDC
	- 10 °C	approx. 28 Kohms	2.2 VDC		
	0 °C	approx. 16 Kohms	1.6 VDC		
	10 °C	approx. 9.0 Kohms	1.1 VDC		
	20 °C	Approx 7.0 Kohms	0.82 VDC		
	30 °C	approx. 4.6 Kohms	0.66 VDC		
	40 °C	approx. 3.3 Kohms	0.50 VDC		
	50 °C	approx. 2.3 Kohms	0.36 VDC		

NOTE: *see §1*
see §2

40 A053 air conditioning unit ("Stepper" heater valve)

Circuit diagram: heater valve "Stepper" (stepper motor)

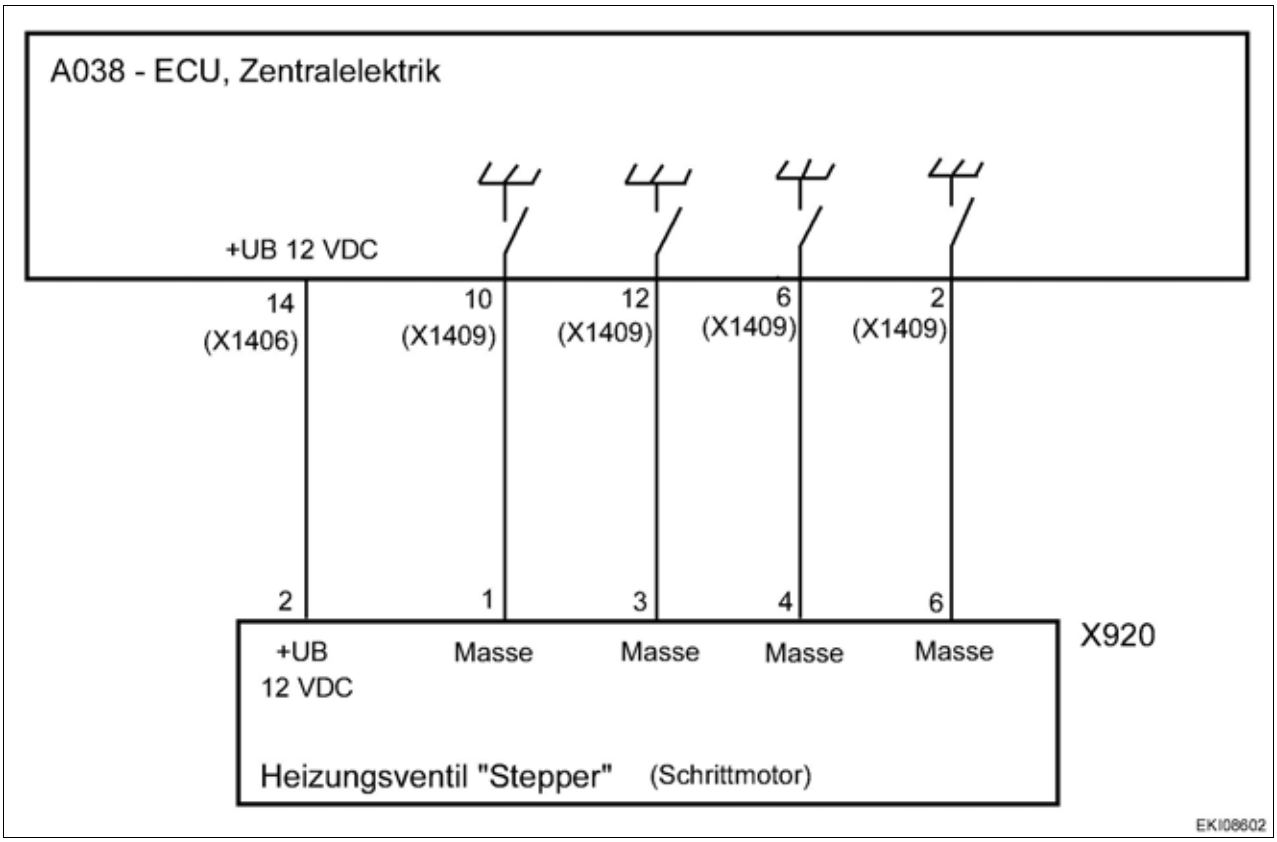


Fig. 110. I002404

Item	Designation	Note
A038 - ECU, central electrical system		
14 (on X1406)	+UB 12 VDC	
10 (on X1409)	Earth for stepper motor (step 1)	
12 (on X1409)	Earth for stepper motor (step 2)	
6 (on X1409)	Earth for stepper motor (step 3)	
2 (on X1409)	Earth for stepper motor (step 4)	
Heater valve "Stepper" (stepper motor)		
X920	Separation point	
2	+UB 12 VDC	
1	Earth for stepper motor (step 1)	
3	Earth for stepper motor (step 2)	
4	Earth for stepper motor (step 3)	
6	Earth for stepper motor (step 4)	

Measuring points and signal values

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see §16*

Prerequisite for this measurement:

– Switch on ignition.
– Use the **vehicle earth** to **earth**

Checking +power supply to heater valve "Stepper"

Pin	description	Signal type/condition	Signal
Checking the supply voltage			
C14 (X1406)	Heater valve signal	Ignition OFF	0 VDC
		Ignition ON.	12 VDC

NOTE: *see §1*
see §2
see §18

41 A055 ECU, Vario-Doc

Components required for Vario-Doc

Tractor side		
Required components	**Available**	**Not present**
Tractor with Vario-Doc equipment – A055 ECU, Vario-Doc – Aerial		

PC side		
Required components	**Available**	**Not present**
Office PC with Bluetooth interface or alternative docking station for PDA (Pocket PC)		
If necessary: **PDA (Pocket PC) with Bluetooth interface and installed field database** (from BASF or Helm) **Recommended manufacturer:** Hewlett Packard		
Internet connection for online field database Example: BASF Helm		
Bluetooth stick (radio transmitter/receiver) We recommend: - **BlueFRITZ! USB v2.0 (AVM)** A smooth transfer of data can only be guaranteed with this tested stick.		
Field database for PC (only use recommended field databases) Vario-Doc cannot be used effectively without a field database. **Previously integrated field databases (version: 03.2008):** **- BASF field database** with activated account and Web Sync software installed (for transferring data) **www.basf-schlagkartei.de** **- Helm Logiss and Multiplant** **www.helm-software.de**		

NOTE:
Support for Sales:

A thorough situation analysis on site is important in the sales pitch to ensure the customer is competently advised. To this end, a Vario-Doc questionnaire has been developed that should be completed by the sales advisor and customer together.

Further to this, the document "Vario DOC Basic: First Steps" is available.
This document provides assistance to both the customer and sales advisor in the event of questions relating to installing and handling the "Vario-Doc system"

The documents can be found on AGCO Net.

https://net.agcocorp.com
Sales/Fendt/Documents

Functional description

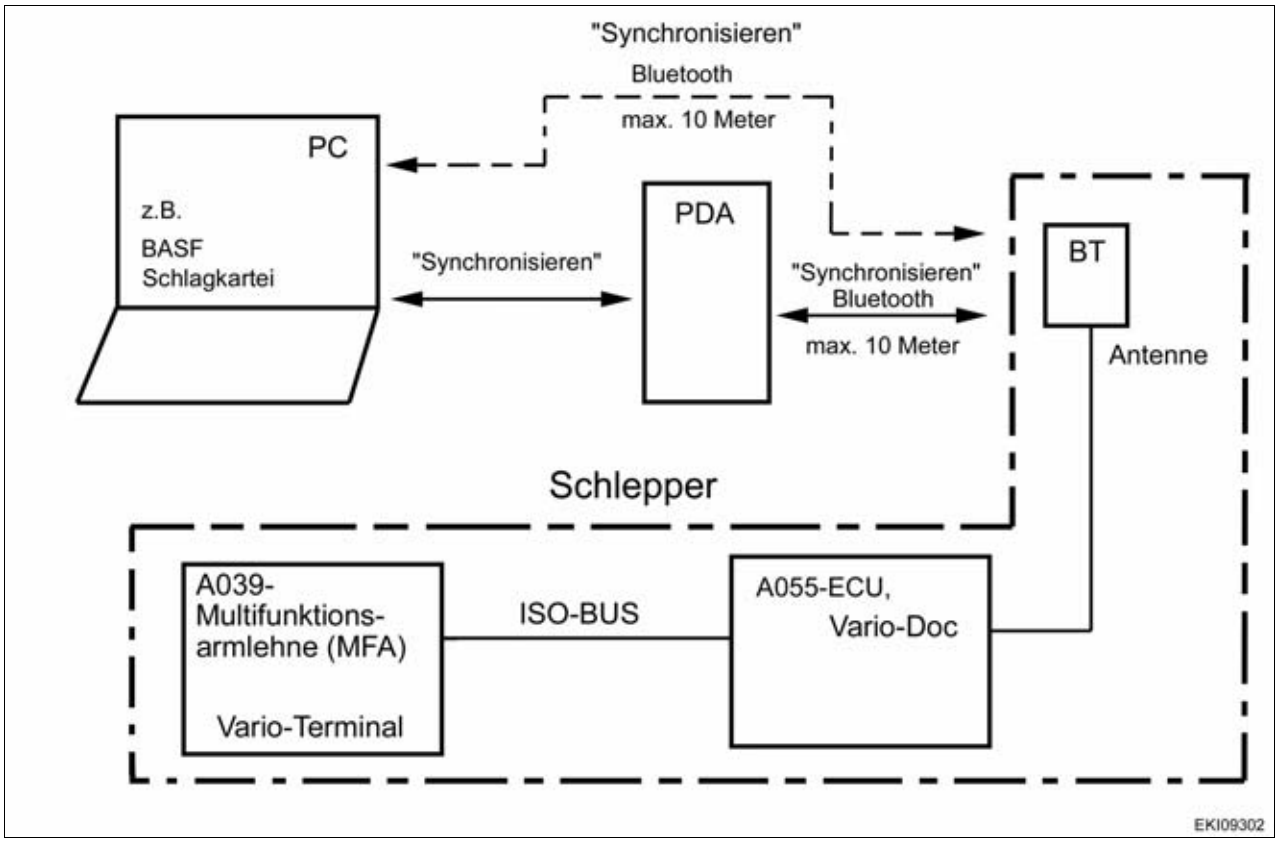


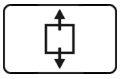
Fig. 111. I006094

Item	Designation	Description
PC	**Personal Computer**	**The field database is processed on the PC.** Field databases are available from various manufacturers: Example: BASF Helm **The field database contains a variety of working processes** One working processes is made up of various data. Example: - Field name - Tractor operator - Implement (e.g. field sprayer) - Resource (e.g. spray) - Ground conditions - etc. **See also:** **User guide for the database (e.g. BASF)**
PDA	**Handheld computer (Pocket PC)**	**The working process from the database** is transferred via Bluetooth **from the PC to the tractor (A055 ECU, Vario terminal). "Synchronised"** **The completed working process** is transferred via Bluetooth **from the tractor (A055 ECU, Vario terminal) to the PC. "Synchronised"** **The Bluetooth connection (radio signal) has a maximum range of approx. 10 metres.** **Option A:** PC <--> Bluetooth <--> Tractor (A055 ECU, Vario terminal) **Option B:** PC <--> Bluetooth <--> PDA (handheld computer) <-->Tractor (A055 ECU, Vario terminal)
BT	**Aerial**	Receives and transmits data
A055	**ECU, Vario-Doc**	**Manages and stores data**
A039	Multifunction armrest (MFA) **Vario terminal**	The work request is displayed on and processed by the Vario. **See also:** **Tractor operator's manual (Point: Vario-Doc)**
ISO bus	**ISO bus**	The A055 ECU, Vario-Doc sends the data to the Vario terminal via the ISO bus. The working process is displayed on the Vario terminal and can be edited by the operator.

A055 ECU, Vario-Doc



On right mudguard.



Remove panel, remove protective cap for diagnostic purposes

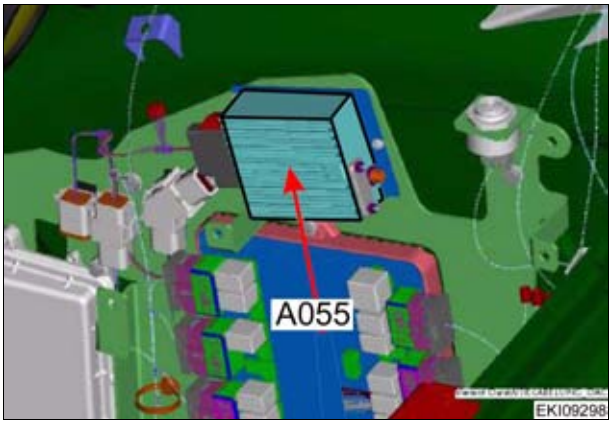
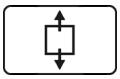


Fig. 112. I005509

Aerial (H 339.970.210.020)



Top right, in cab ceiling



Remove roof lining.

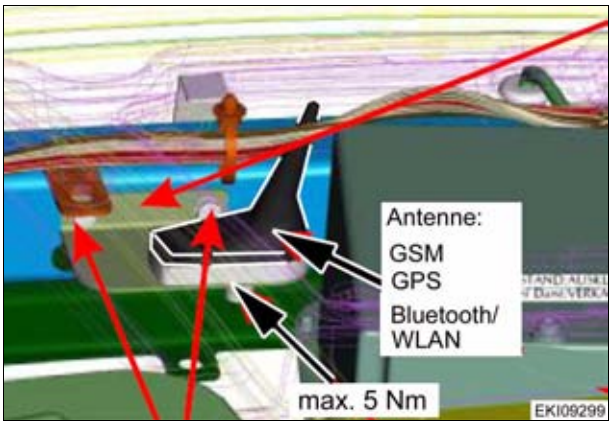


Fig. 113. I005510

A055 ECU, Vario-Doc

LED 1 to LED 6	for A055 ECU diagnostics
BT	**Bluetooth aerial** (for transmitting documentation data)

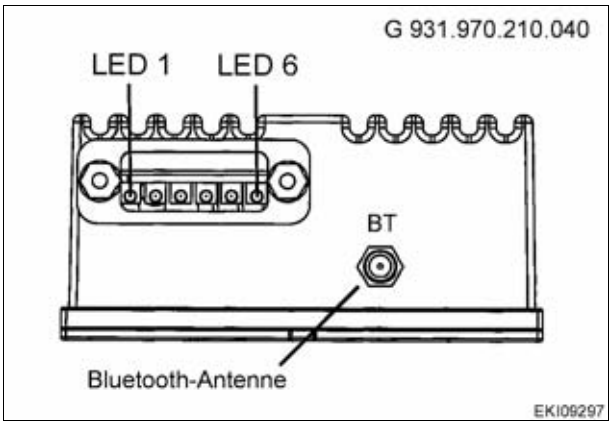


Fig. 114. I006093

LED	Colour	Description
LED 1	green	A055-ECU activated
LED 2	yellow	-
LED 3	red	A055 ECU memory full. Transfer data via Bluetooth from the A055 ECU to PC (PDA) (synchronise data)

LED	Colour	Description
LED 4 (flashes)	green	No operating data on the Vario-Doc
LED 5	yellow	Operating data from the Vario-Doc incorrect Transfer data via Bluetooth from PC (PDA) to the A055 ECU (synchronise data)
LED 6	red	ISO bus mode not activated. Restart tractor. Select ISO mode on the tractor.

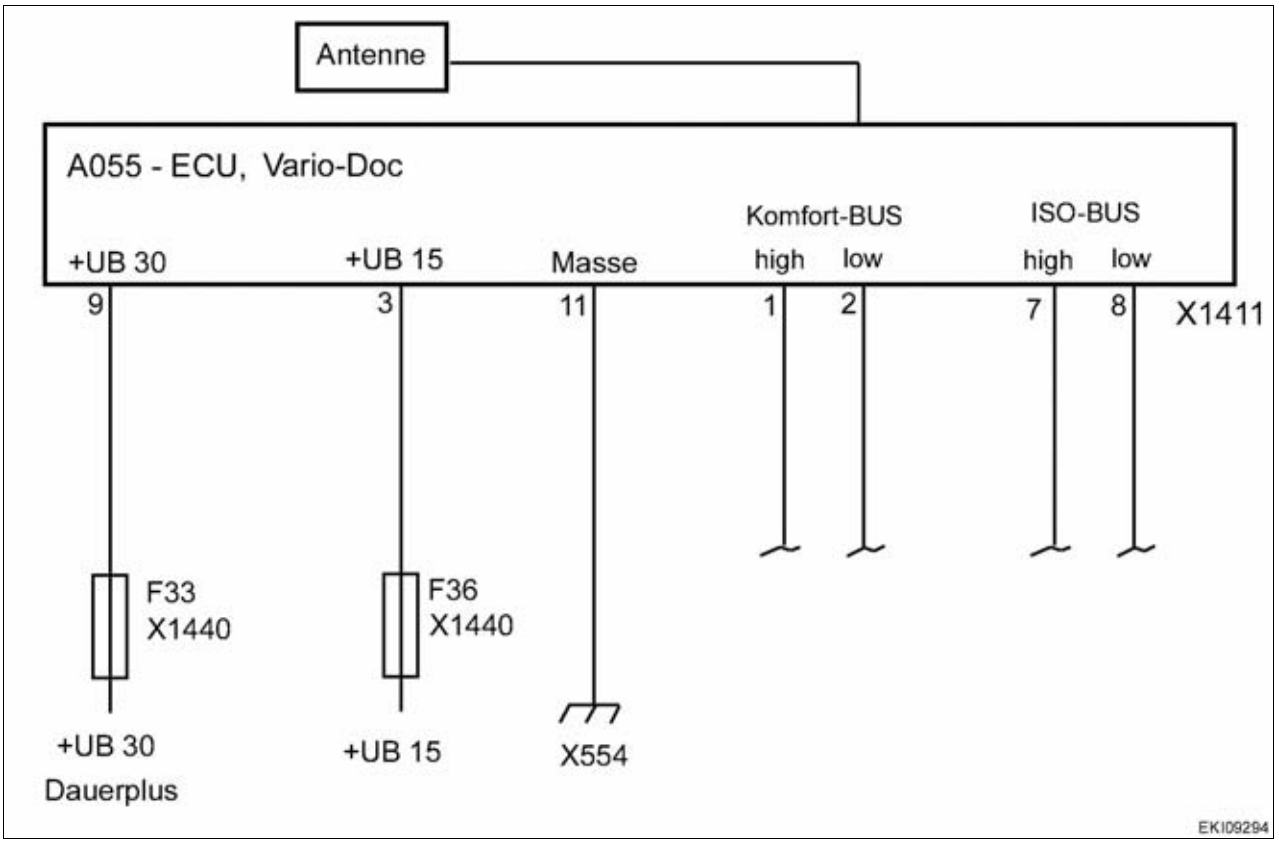


Fig. 115. Circuit diagram: A055 ECU, Vario-Doc I006092

Pins on the A055 ECU, Vario-Doc

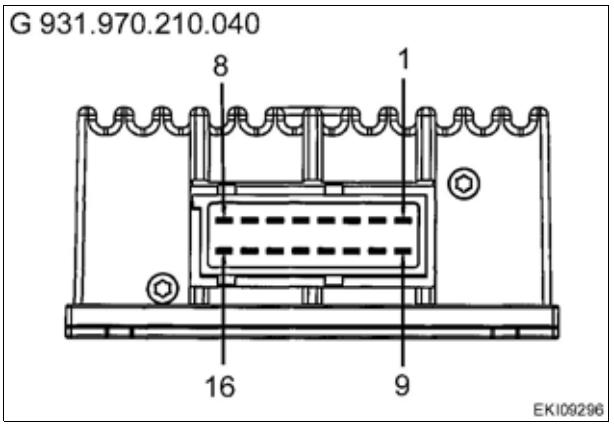


Fig. 116. I005516

919 .. 0101-1000
919 .. 1001-
922 .. 0101-1000
922 .. 1001-
925 .. 0101-1000
925 .. 1001-
928 .. 0101-1000
928 .. 1001-
931 .. 0101-1000
931 .. 1001-
934 .. 0101-1000
934 .. 1001-

Connect adapter cable X899.980.208.220 to the A055 ECU, Vario-Doc



Fig. 117. I005536

Connect adapter box (68-pin) X899.980.208.100

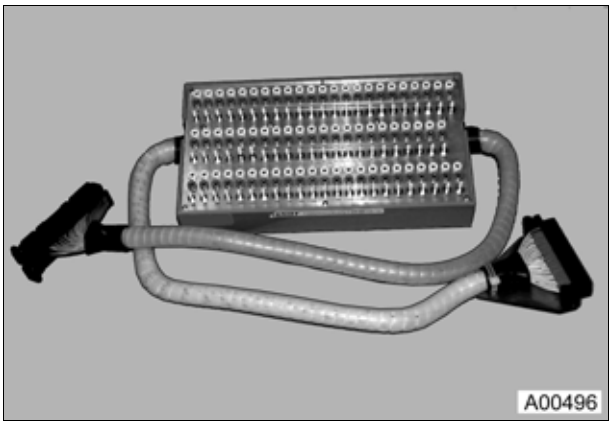


Fig. 118. I005686

Aerial

Item	Designation
Bluetooth/WLAN	Radio signal
GPS	GPS position signal
GSM	Phone signal

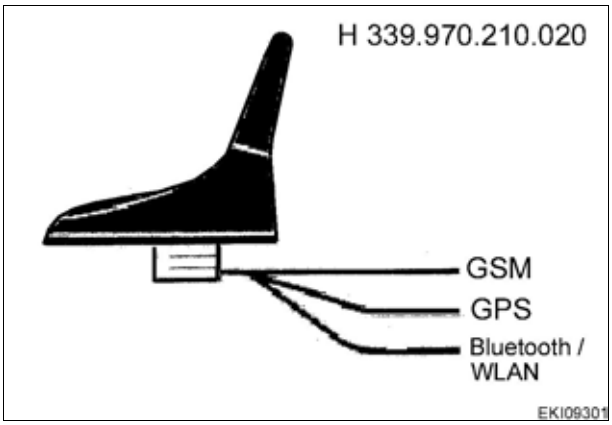


Fig. 119. I005517

A055-ECU, MoDaSys wiring

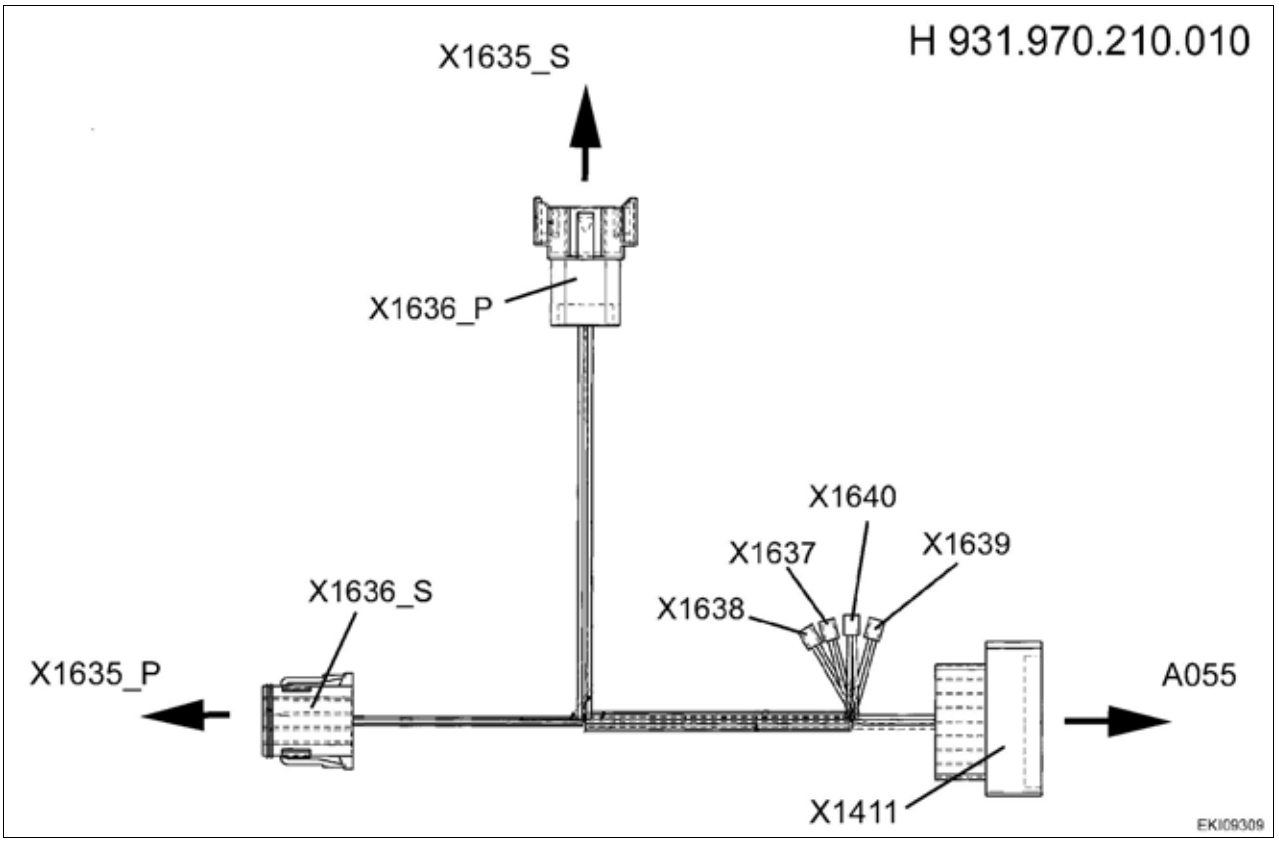
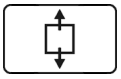


Fig. 120. Connection cable (H 931.970.210.010) I005547

X1635 separation point
X1636 separation point (cable set H 931.970.210.010)



Cab, right mudguard, bottom



Remove panel.

NOTE: *Open X1635 separation point and insert cable set (H 931.970.210.010).*

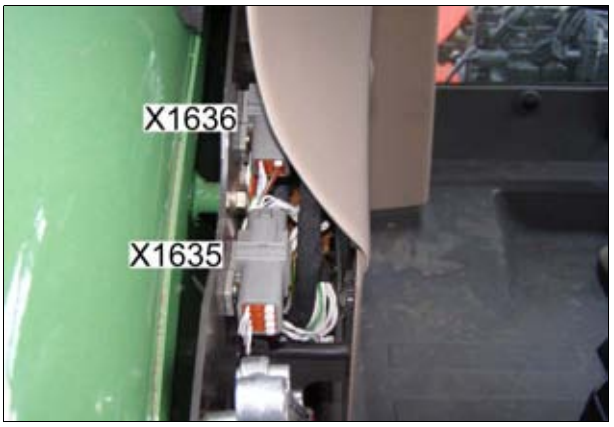


Fig. 121. I001302

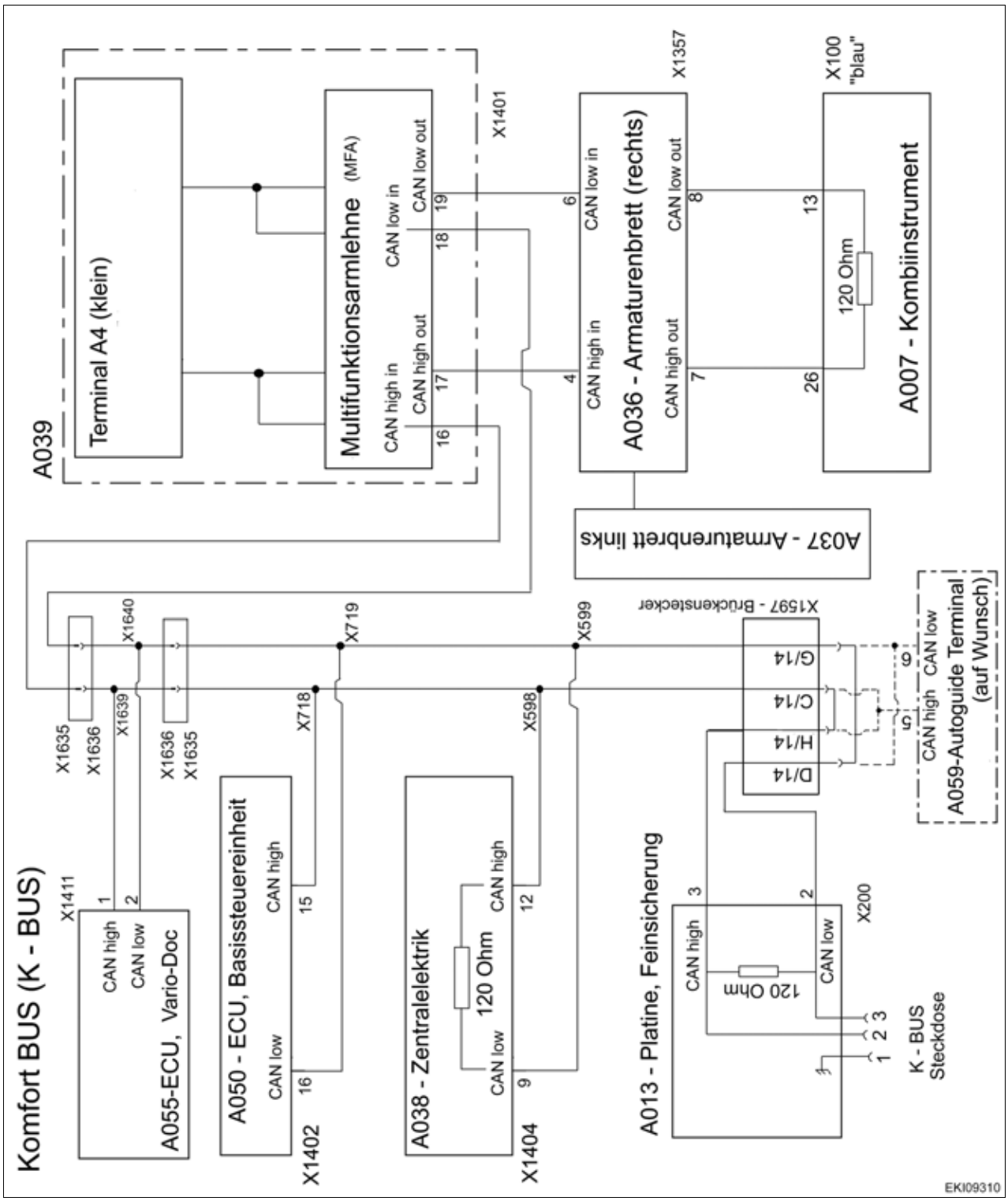


Fig. 122. Control bus (Version A)

I006095

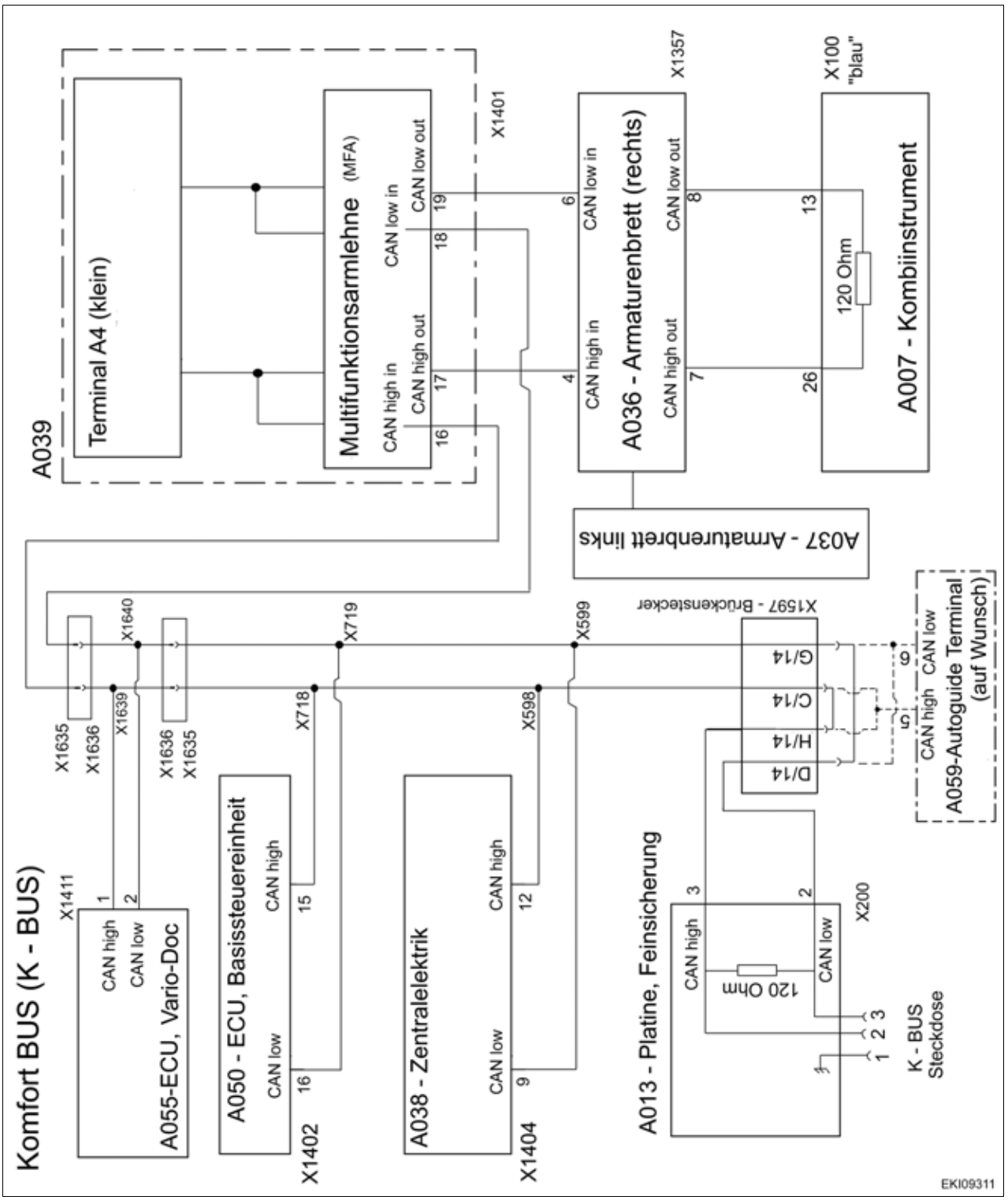


Fig. 123. Control bus (Version B) I006096

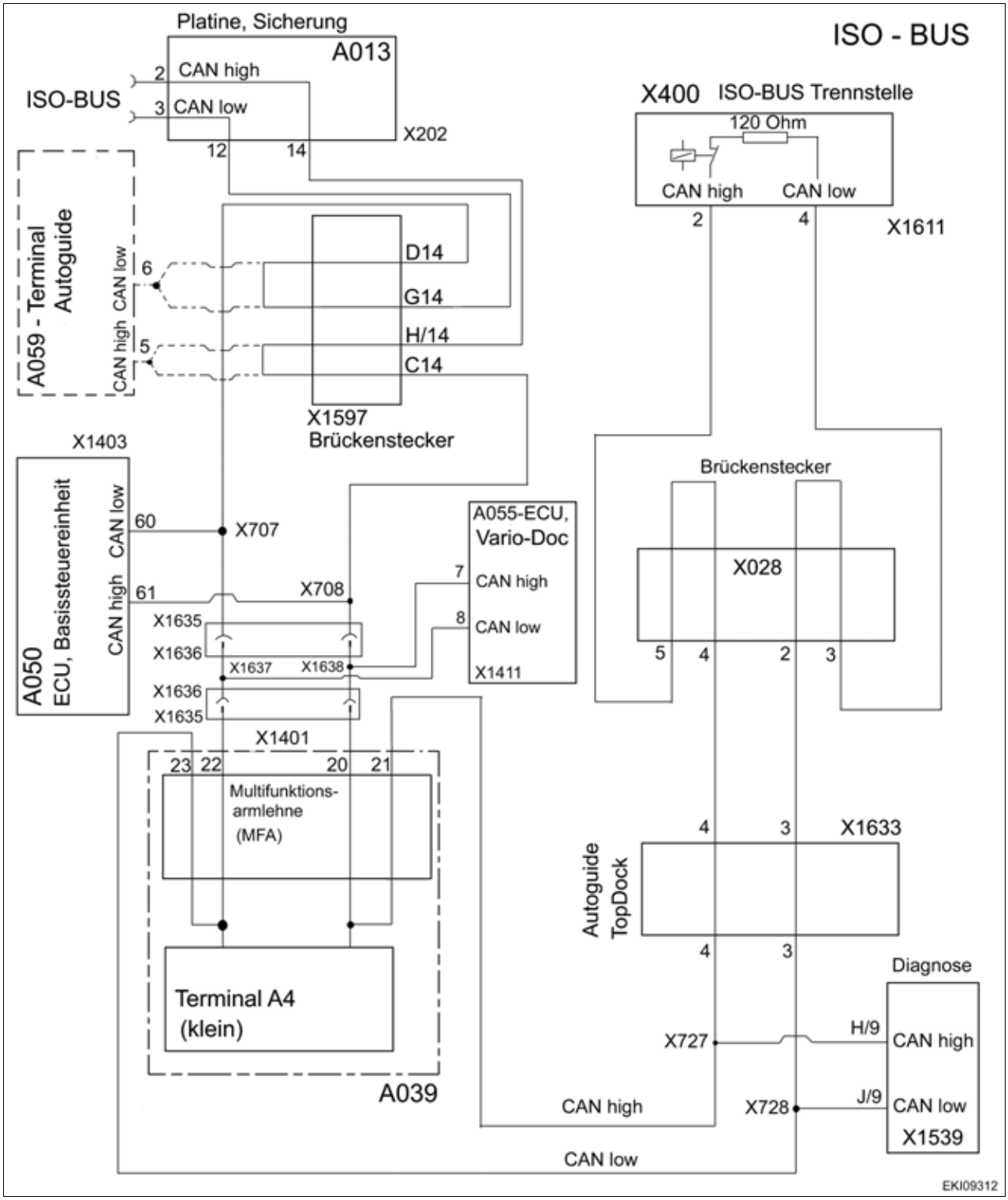


Fig. 124. ISO bus

I006097

42 A058 Autoguide TopDock (receiver unit)

Autoguide TopDock Fit



On cab ceiling (in ceiling compartment).

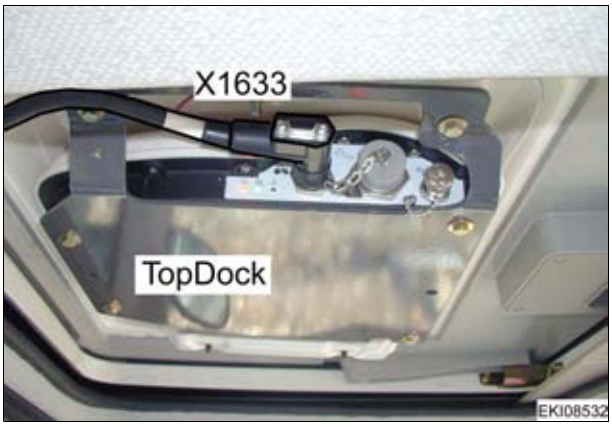


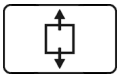
Fig. 125. I002345

X1633 separation point for "TopDock"
X1633_S separation point (socket)
X1633_P separation point (pin, side view)

TopDock – connecting cable to TopDock (receiver unit)



Top right in cab ceiling.



Remove right B051 loudspeaker.

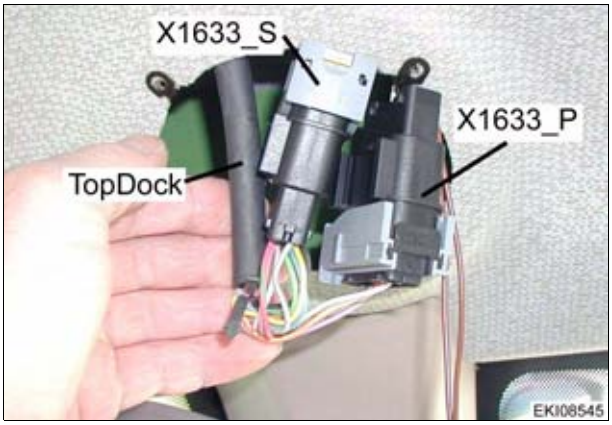


Fig. 126. I002351

Diagram: Autoguide system (FENDT 900 Vario COM III)

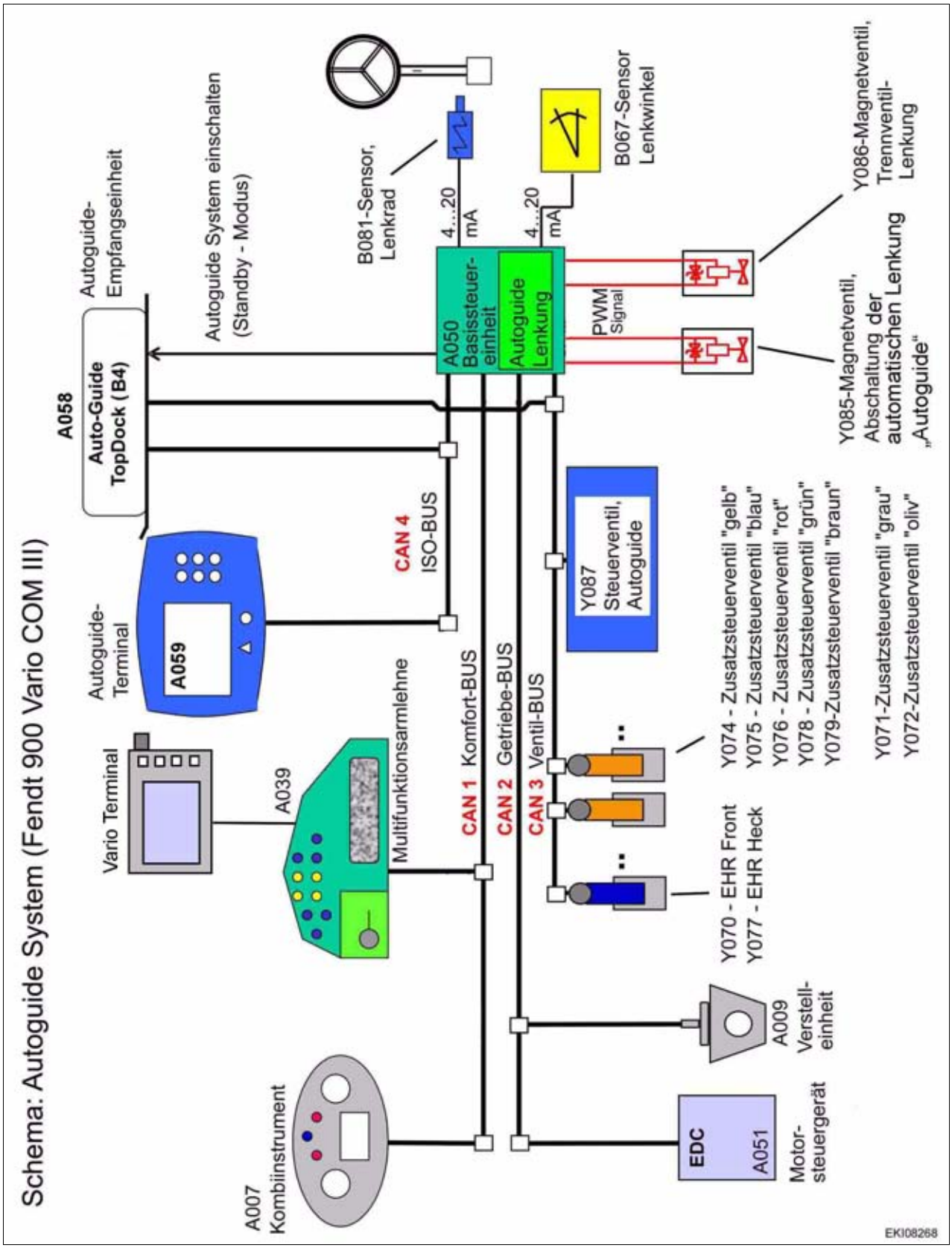


Fig. 127.

I002162

Circuit diagram: A058 Auto-Guide TopDock

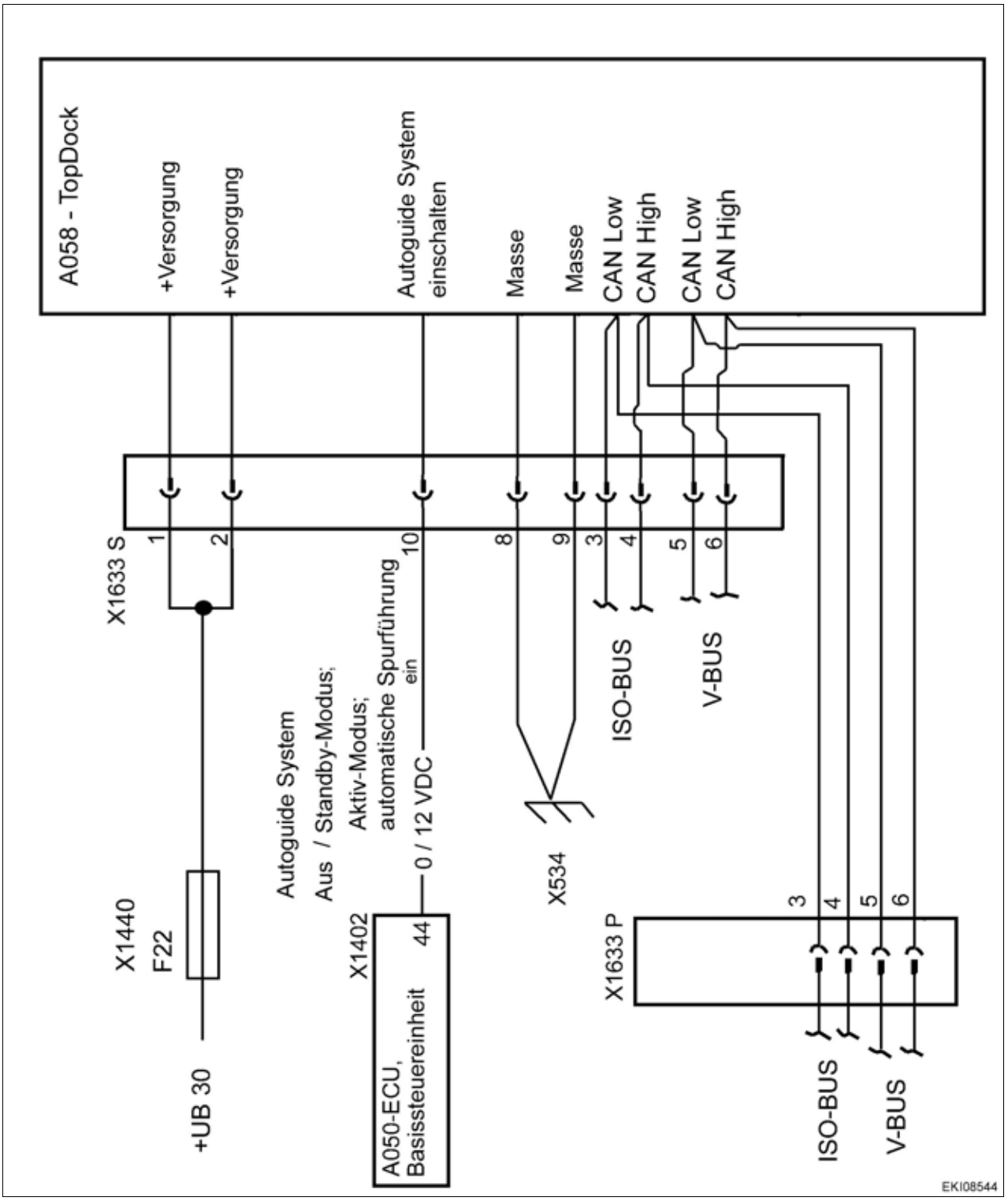


Fig. 128. Wiring of the A058 Auto-Guide TopDock

I004836

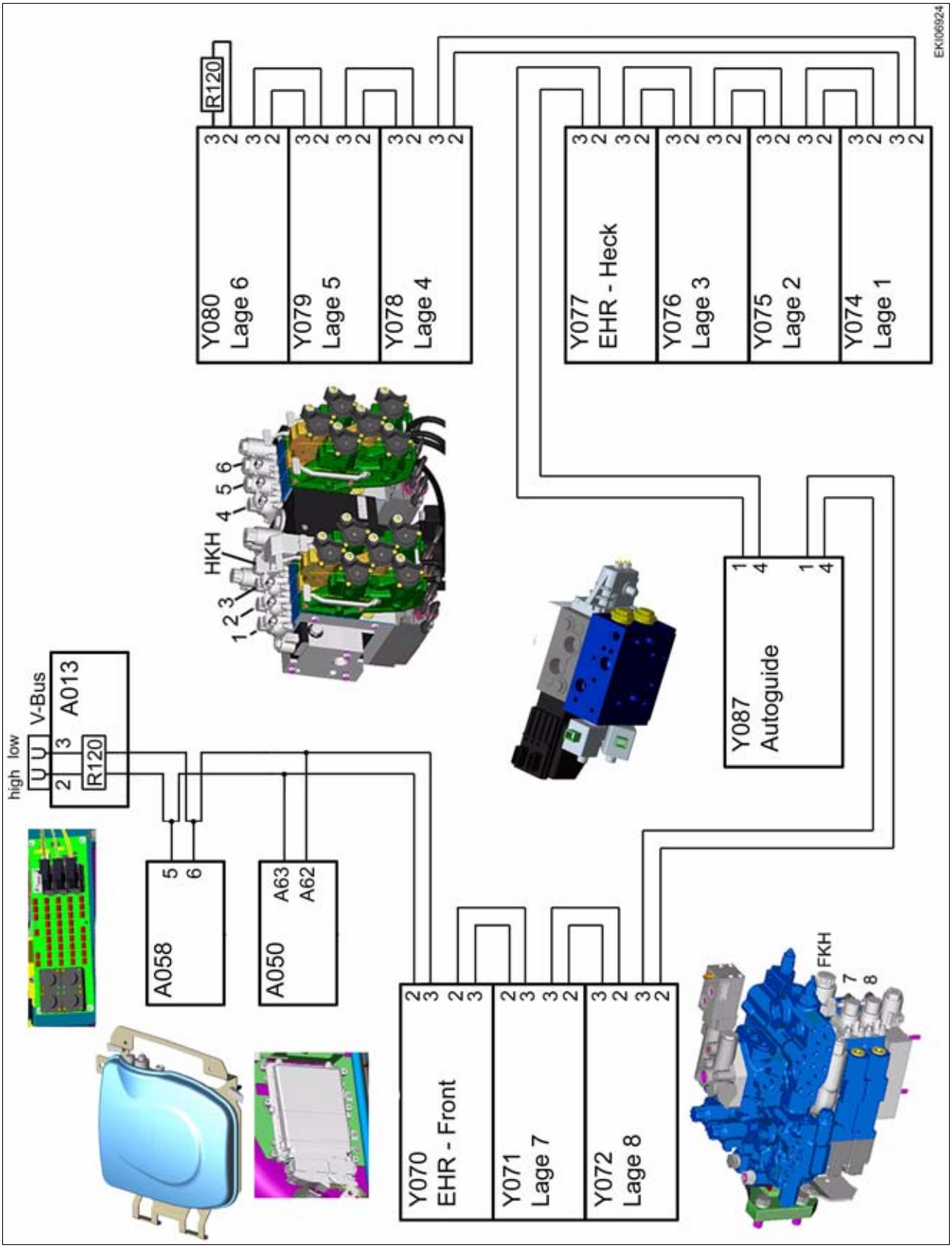


Fig. 129. Diagram: Valve BUS (V-BUS)

I004837

NOTE: *See also:*
Chapter 9000 Reg. E – A050 ECU, basic control unit (area: Autoguide "automatic track guide").
Chapter 9000 Reg.E - A050 ECU, basic control unit (area: CAN bus connection).



Fig. 130. I001030

Layout of Auto-Guide TopDock (GPS receiver unit, gyro compass "DMU"; radio module (with base station only))

Disconnect and remove A058 TopDock.

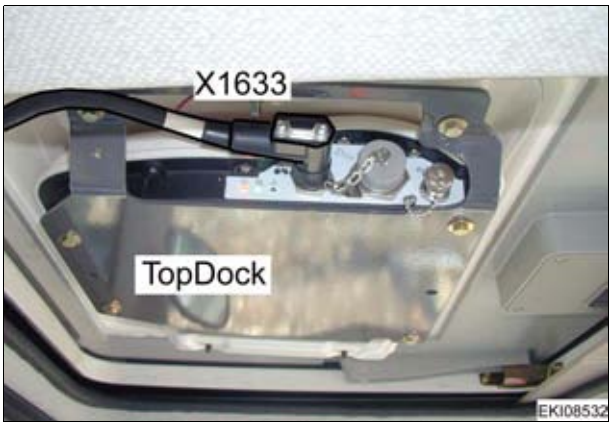


Fig. 131. I002345

Remove retaining plate.

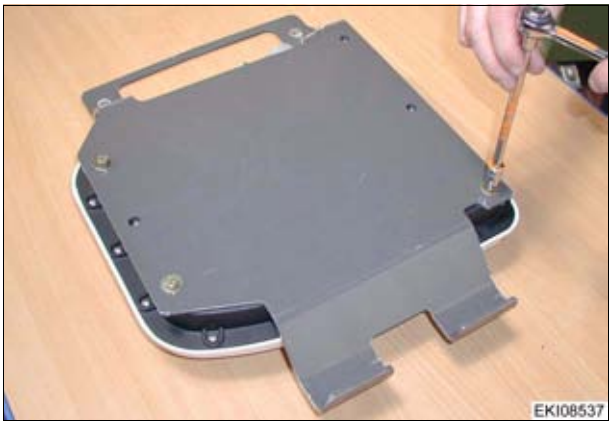


Fig. 132. I002352

DMU – gyro-compass
Radio – radio module (2-way radio receiver) (only fitted when a base station is included)



Fig. 133. I002353

A = system display
+ supply
Satellite reception
Diagnostics

B = X1633 separation point

C = Diagnostics separation point (not used by FENDT)

D = connection for a 2-way radio aerial
(connect 2-way radio aerial if base station is being used)

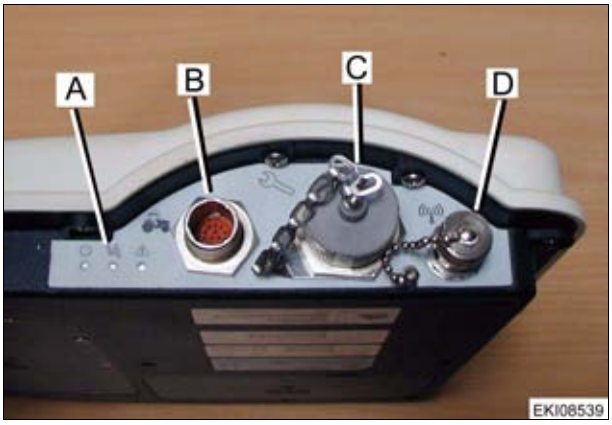


Fig. 134. I002354

Remove cover.
Remove gyro-compass "DMU".



Fig. 135. I002355

Separation point on DMU (gyro-compass)	
ws	white
gn	green
rt	red
bl	blue
or	orange
sw	black
n.b.	Not assigned

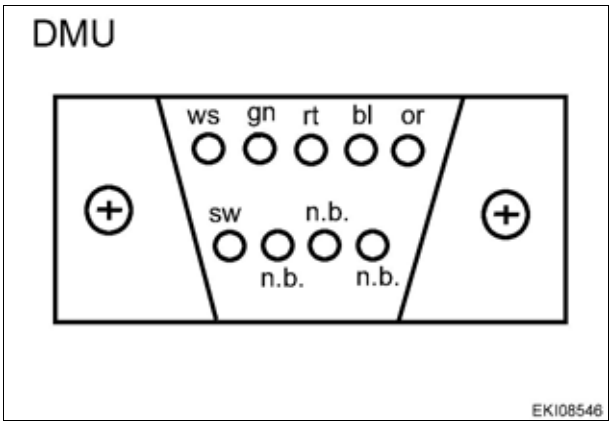


Fig. 136. I002359

Remove cover.
Radio module (2-way radio receiver)
(only fitted when a base station is used)



Fig. 137. I002356

Remove protective cover.
GPS aerial (satellite receiver)



Fig. 138. I002357

Rating plates



Fig. 139. I002358

Radio – radio module (2-way radio receiver) (only when a base station is used)
DMU – gyro-compass
TopDock – satellite receiver unit

Setting standby mode

After switching off the tractor (ignition OFF), the A058 Autoguide TopDock switches to standby mode.
The red indicator light (+power supply) (display A) lights up.
While in standby mode, the A058 Autoguide TopDock keeps the connection with the GPS satellites, which reduces the startup time of the Autoguide system.

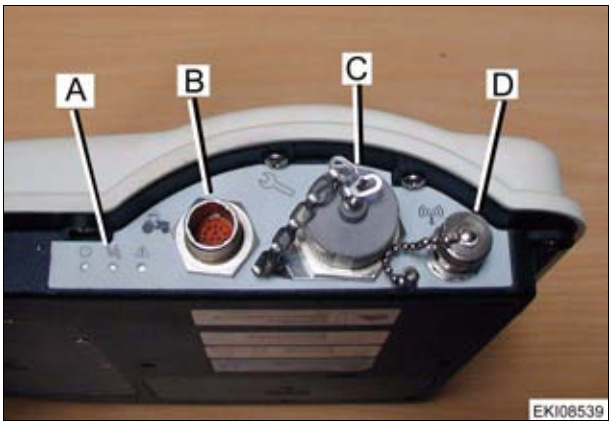


Fig. 140. I002354

The standby time can be set on the A059 Autoguide terminal.
Scroll with the "arrow buttons".



Fig. 141. I002414

The next screen is displayed.
Continue to the diagnostics menu with the "spanner" button.



Fig. 142. I002415

The first diagnostics screen id displayed.
Continue with the "arrow button".



Fig. 143. I002416

The second diagnostics screen is displayed.
Select "Standby".



Fig. 144. I002417

The standby mode settings are displayed.



Select hours, minutes and seconds with the arrow buttons.
Note: the current selection is highlighted in blue.



Enter the desired standby time (max. 48 hours) using the alphanumeric keypad.

Press "Return" to confirm settings.





Fig. 145. I002418

The set time can be reset to zero by pressing the "Delete" button.



Fig. 146. I002422

43 A059 Autoguide terminal

A059 Autoguide terminal



Fig. 147. I001366

Connecting cable for A059 Autoguide terminal.

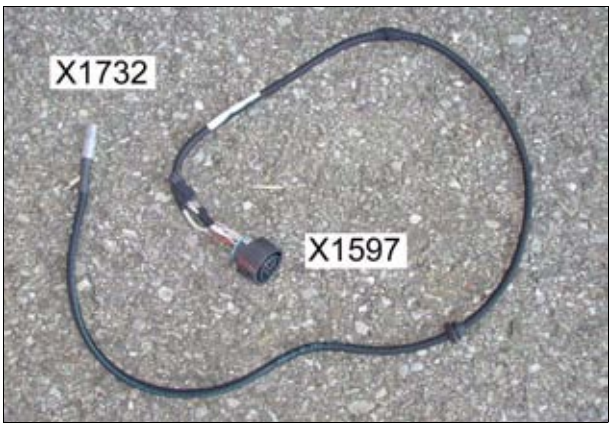
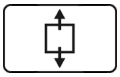


Fig. 148. I002346

Connect the X1597 separation to tractor wiring harness



On right mudguard



Remove panel



Fig. 149. I002347

Connect the X1732 separation point to A059 Autoguide terminal.



Fig. 150. I002348

Diagram: Autoguide system (FENDT 900 Vario COM III)

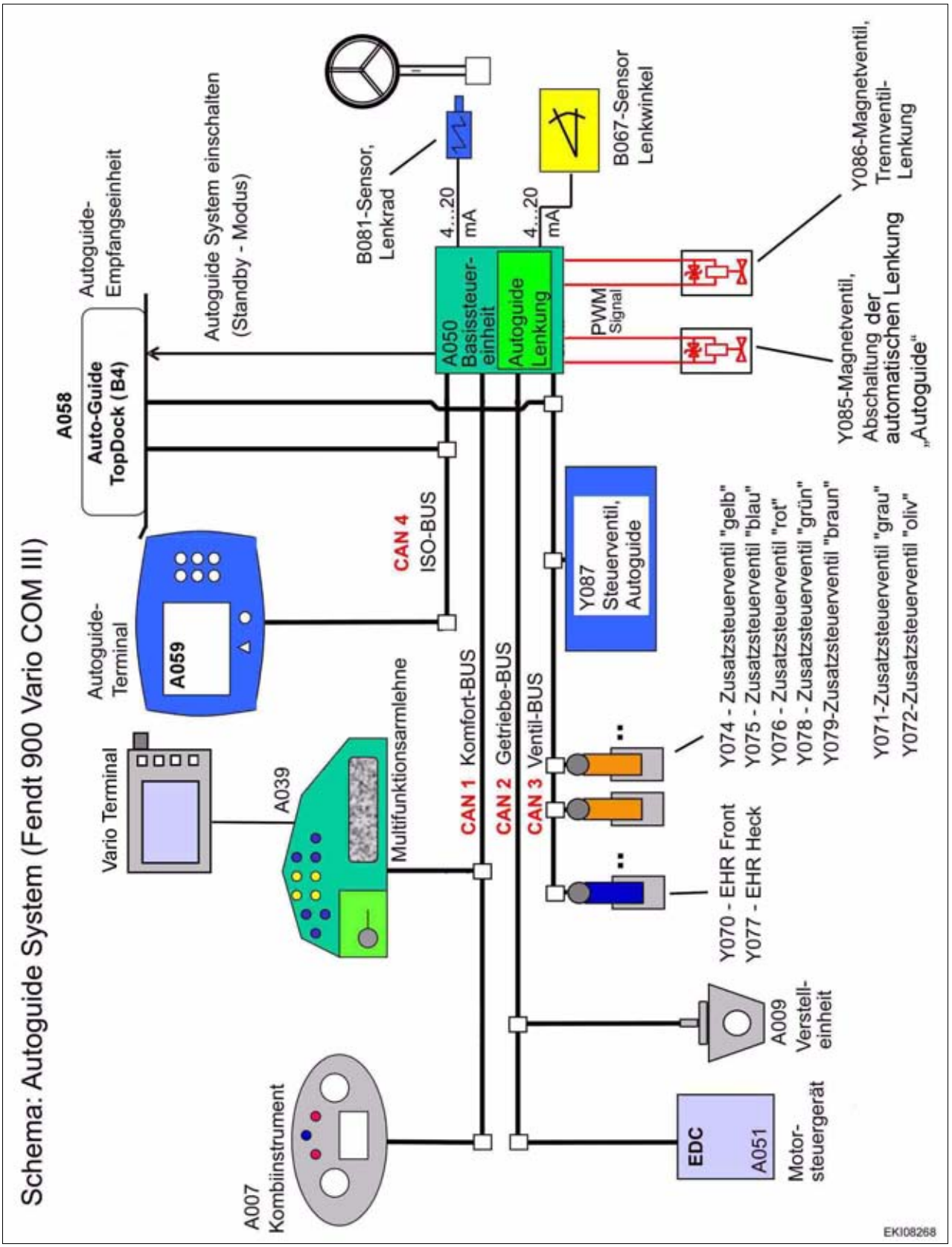


Fig. 151. I002162

Circuit diagram of A059 Autoguide terminal

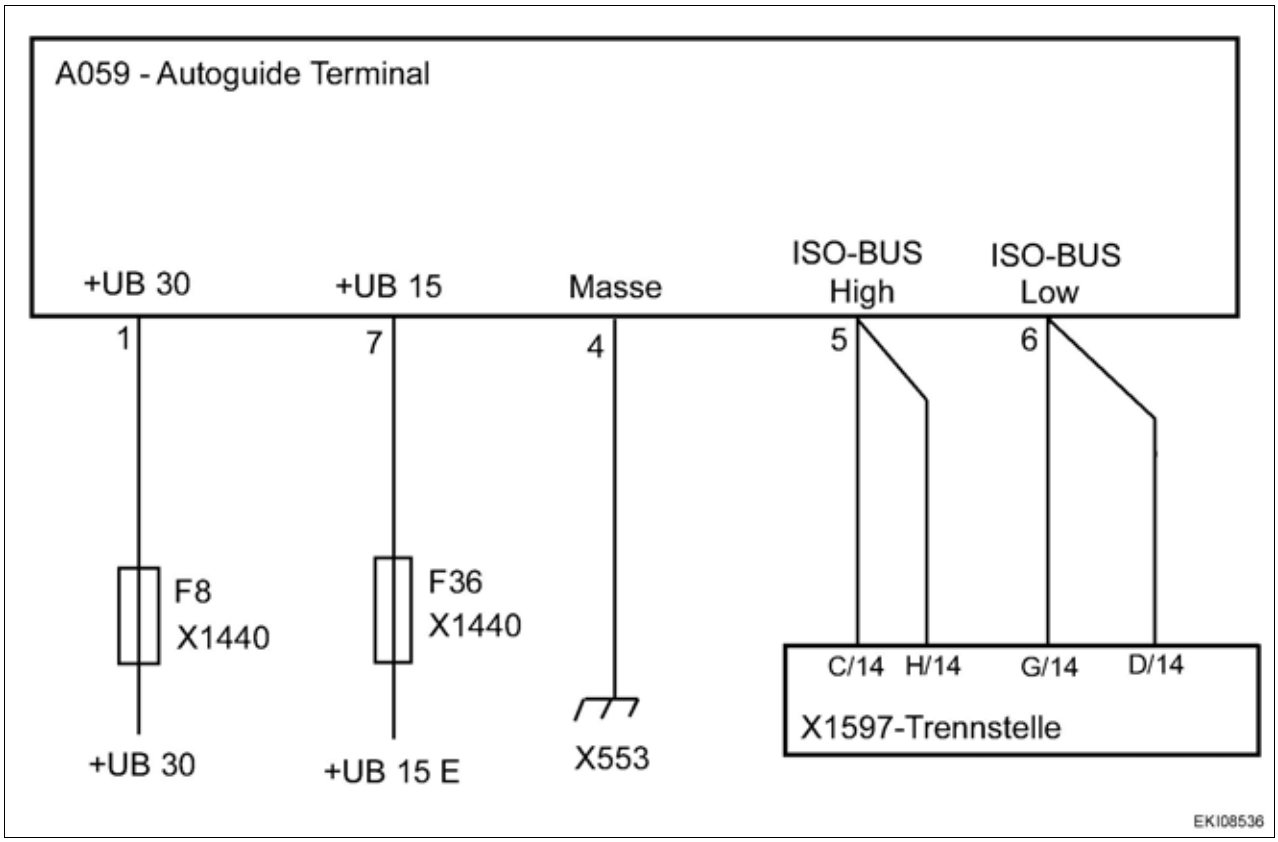


Fig. 152. I002349

NOTE: *See also:*
Chapter 9000 Reg.E – A050 ECU, basic control unit (area: Measuring and testing CAN bus connection).
Chapter 9000 Reg. E – A050 ECU, basic control unit (area: Autoguide "automatic track guide").



Fig. 153. I001030

NOTE: *See also:*
Chapter 4090 Reg. E - Autoguide programming.



Fig. 154. I001366

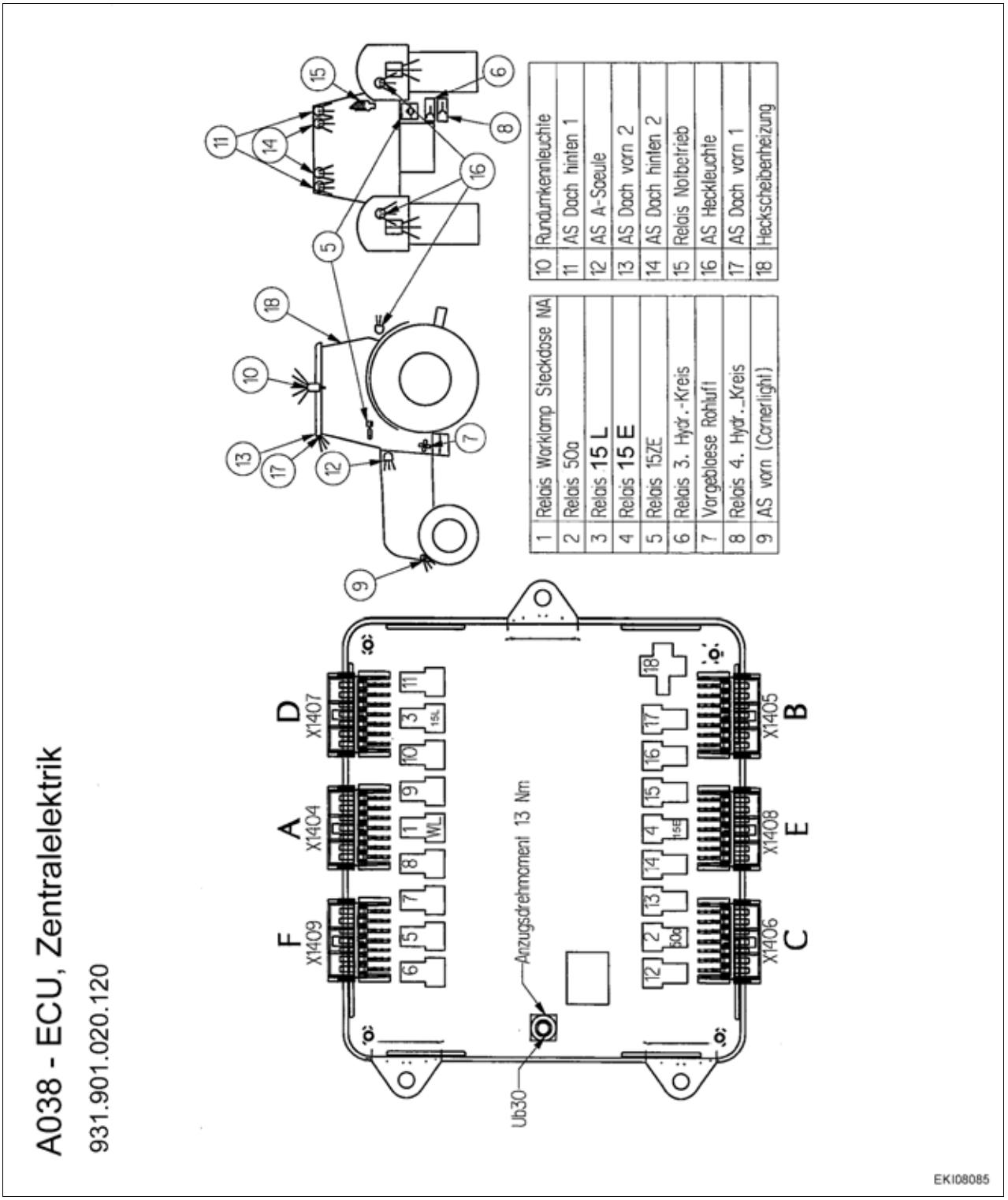


Fig. 155. I001997

A038 ECU, central electrical system
Pos. 4 = relay 15 E

44 A060 Handsfree system for mobile phone

Handsfree system



Top right in cab roof

NOTE: ***We recommend:***
Modular universal handsfree kit

CULLMANN GmbH
90553 Cadolzburg
Germany

www.cullmann.de
service@cullmann.de
Hotline: +49 (0) 9103-5000-380



Fig. 156. I004909

Installation will require:	
Designation	**Order number**
Installation manual for the handsfree kit **Note:** **The installation manual contains the order numbers required to retrofit a handsfree kit**	**X 990.006.774.000** **(Installation manual for FENDT 900 Vario COM III)**
Adapter cable	**H 339.810.230.070** **(FENDT 300/400/700/800 Vario COM III)** **H 931.812.230.070** **(FENDT 900 Vario COM III)**

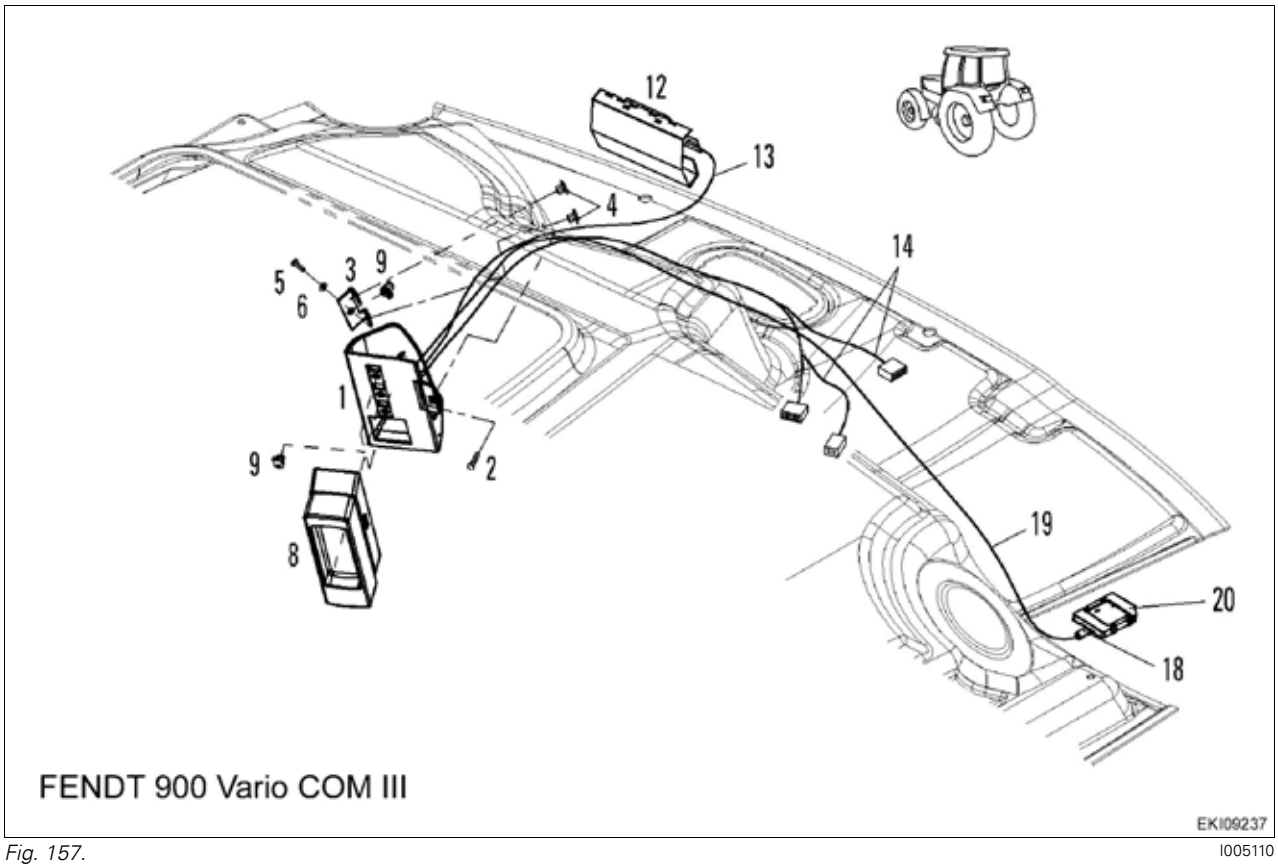


Fig. 157. I005110

Item	Designation	Item	Designation
1	Bracket for handsfree kit	9	Nut
2	Screw	12	**GSM aerial** (H 931.812.230.050) (The GSM aerial is for transmitting and receiving the telephone signal)
3	Angle bracket	13	Cable for the GSM aerial (H 931.812.230.060)
4	Blind rivet	14	**Adapter cable** (H 931.812.230.070)
5	Screw	18	**GPS aerial** (H 931.812.230.080) (The GPS aerial is for receiving GPS position signals. The GPS position signals are required to operate a mobile phone with navigation features.)
6	Washer	19	Cable for the GPS aerial (H 931.812.230.090)
8	**Basic "mobile phone bracket"** (G 931.812.230.070)	20	Bracket for the GPS aerial

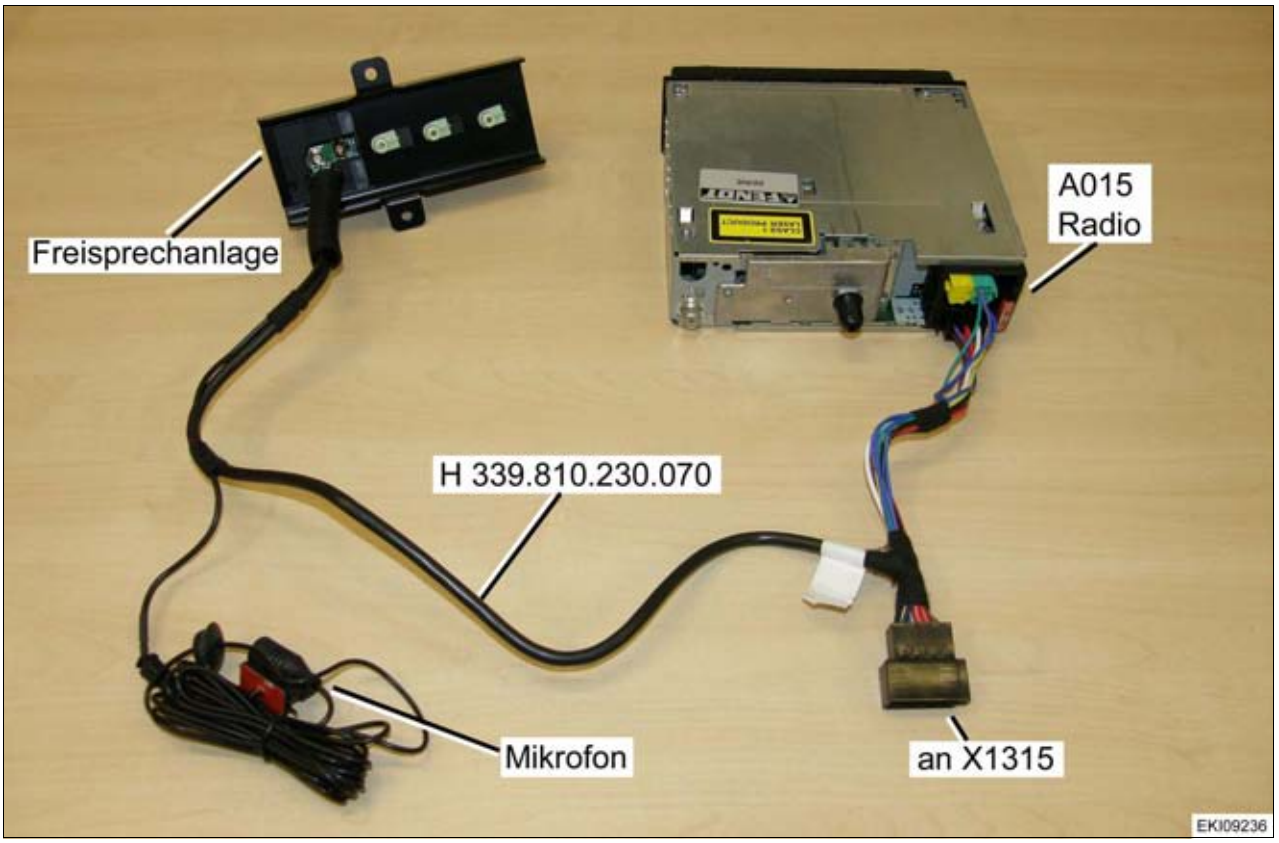


Fig. 158. Wiring set to link A015 radio and A060 handsfree system I005104

H 339.810.230.070	FENDT 300/400/700/800 Vario COM3
H 931.812.230.070	(FENDT 900 Vario COM3)
Note: The adapter cables only differ in length	

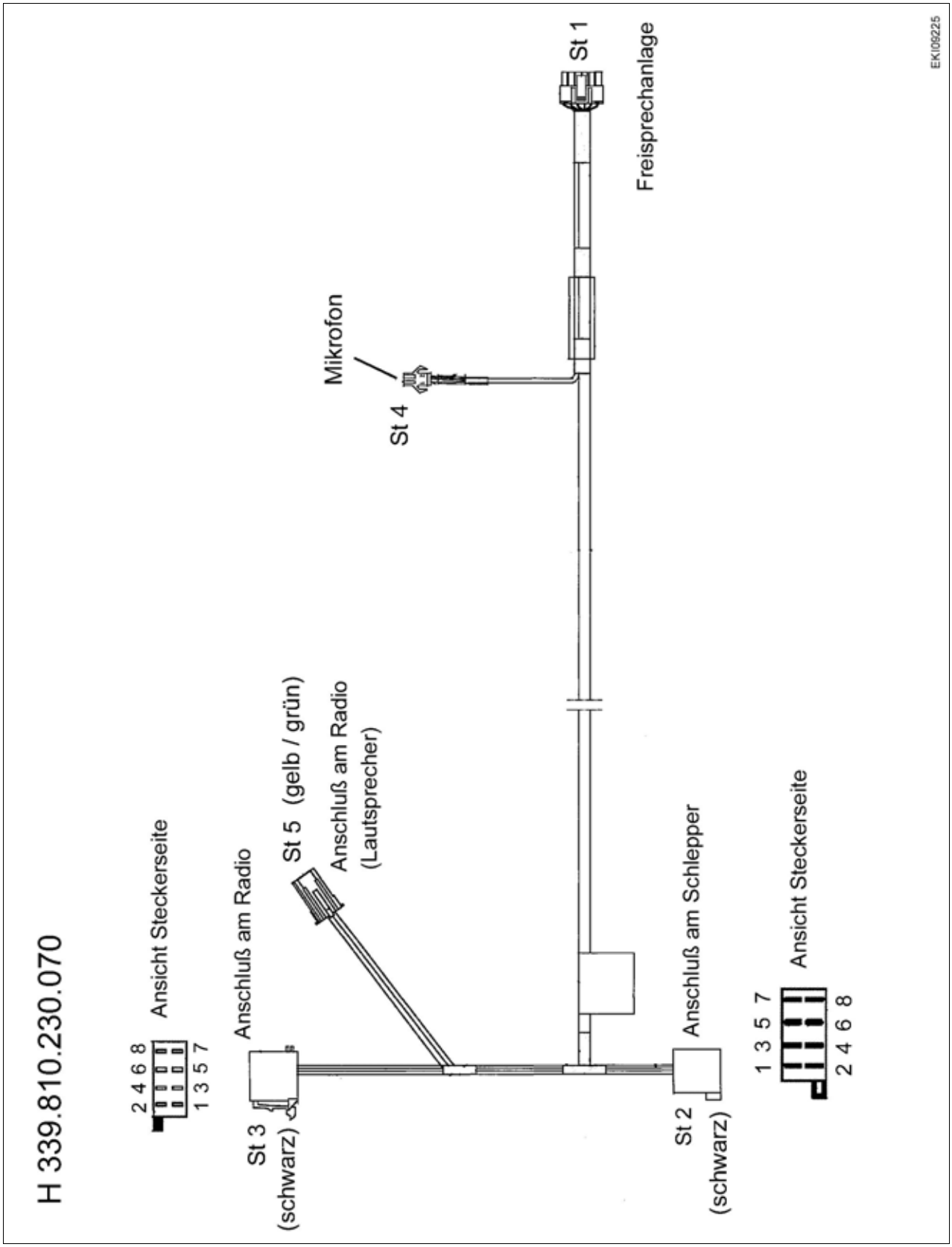


Fig. 159. Adapter cable H 339.810.230.070/H 931.812.230.070

I005105

Installing the handsfree system

Remove A015 radio.
Disconnect X1315 connector.
Connect adapter cable.

H 339.810.230.070	FENDT 300/400/700/800 Vario COM3
H 931.812.230.070	(FENDT 900 Vario COM3)
Note: The adapter cables only differ in length	

Ports on A015 radio	
Connector	**Colour**
X1316	brown
St 5	green/yellow
St 3	black
Aerial	-

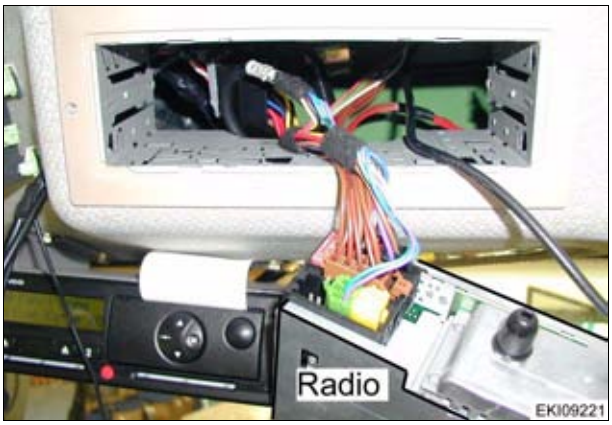


Fig. 160. I004912

Cable routing for handsfree system



Fig. 161. I004910

Connect adapter cable H 339.810.230.070 to the handsfree system

Ports on the handsfree system	
Connector	**Colour**
St 1/St 4	black
GSM aerial (receiving/transmitting phone signal)	-
GPS aerial (receiving GPS position signal) (Mobile phone with navigation feature)	-

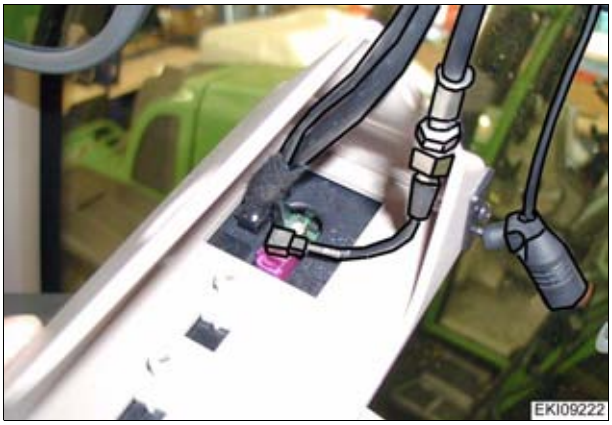


Fig. 162. I004911

Adapter cable (H 339.810.230.070/H 931.812.230.070)
NOTE: *The adapter cables only differ in length*

Line number	From	To	Diameter (sq. mm)	Colour	Function
1	**St 2**/1	**St 3**/1	0.5	violet	v signal
2	**St 2**/2	**St 3**/2	0.5	brown	Mute Nav (Radio mute)
3	**St 2**/3	**St 3**/3	1.0	red	K

Line number	From	To	Diameter (sq. mm)	Colour	Function
4	**St 2**/4	**St 3**/4	1.0	red	+UB 30 (permanent positive)
5	**St 2**/5	**St 3**/5	1.0	white	Control +
6	**St 2**/6	**St 3**/6	0.5	blue	Light
7	**St 2**/7	**St 3**/7	0.5	yellow	+UB 15 (ignition)
8	**St 2**/8	**St 3**/8	1.0	black	Earth (terminal 31)
9	**St 1**/12	**St 2**/8	0.5	black	Earth (terminal 31)
10	**St 1**/5	**St 2**/7	0.5	yellow	+UB 15 (ignition)
11	**St 1**/6	**St 2**/4	0.5	red	+UB 30 (permanent positive)
12	**St 1**/10	**St 2**/2	0.5	brown	Mute Nav (Radio mute)
13	**St 1**/9	**St 5**/7	0.5	violet	Loudspeaker (LF+)
14	**St 1**/3	**St 5**/8	0.5	blue	Loudspeaker (LF-)
15	**St 1**/11	**St 5**/9	0.5	green	Mute Tel.
16	**St 1**/7	**St 4**/1	Core	-	Microphone (Microphone connector signal)
17	**St 1**/1	**St 4**/2	Shield		GNDA (Microphone connector earth)

45 B002 sensor, front PTO speed

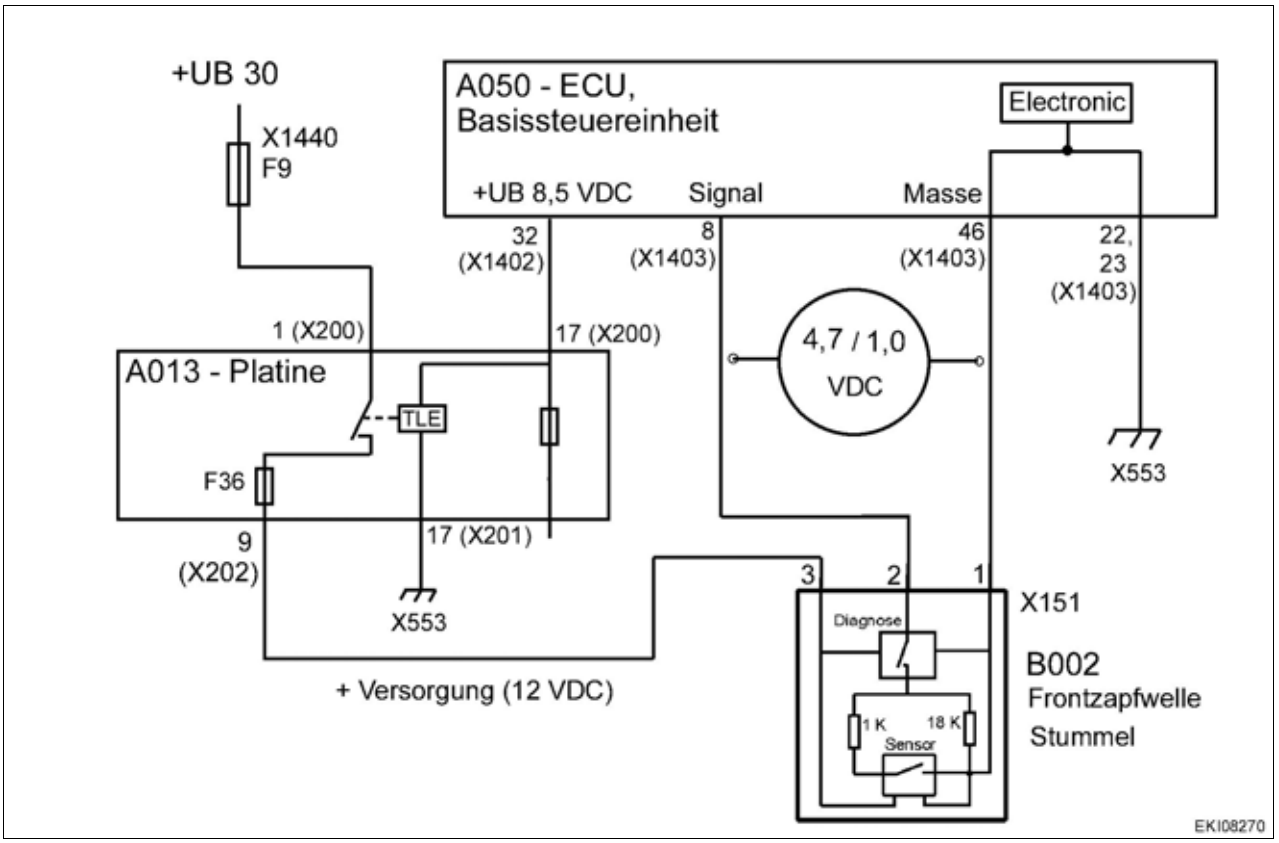


Fig. 163. I002976

Item	Designation	Note
A013 - PCB, microfuses **(microfuse no. 36)**		
X200	Separation point on the A013 PCB microfuse	
X201	Separation point on the A013 PCB microfuse	
X202	Separation point on the A013 PCB microfuse	
Pin 1 (X200)	+ supply for the A013 PCB_microfuse (12 VDC)	
Pin 17 (X200)	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 17 (X201)	Earth	
Pin 9 (X202)	+ supply for the B002 sensor (12 VDC)	Switch on ignition.
A050 - ECU, basic control unit		
X1402	Separation point on the A050 ECU, basic control unit	
X1403	Separation point on the A050 ECU, basic control unit	
Pin 32 (X1402)	+ supply for the A013 PCB_microfuse (9.0 VDC)	Switch on ignition.
Pin 8 (X1403)	Signal	When stationary, depending on ratchet wheel position
Pin 46 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
B002 - Sensor, front PTO speed		
X151	Separation point on B002 sensor	
Pin 1	Earth	

Item	Designation	Note
Pin 3	+ supply (12 VDC)	Switch on ignition.
Pin 2	Signal	When stationary, depending on ratchet wheel position
X553 earth pin		
X1440 fuse holder		

Measuring points and signal values

Measuring points on B002 sensor, front PTO speed	
Pin	**Function**
1	Earth
2	Signal
3	+ supply

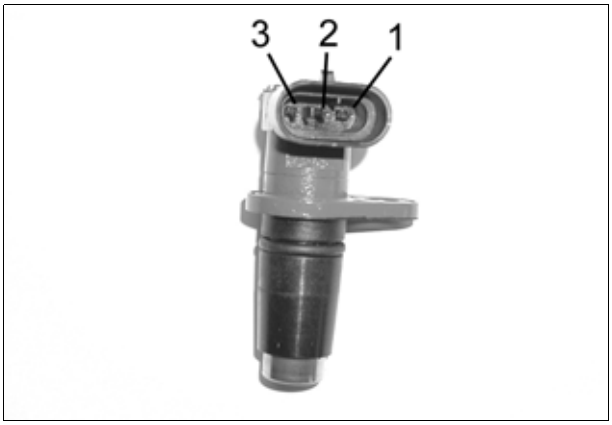


Fig. 164. I000616

NOTE: *Connect the X899.980.246.205 adapter cable directly to the **B002** - Sensor, front PTO speed.*
Ignition ON.
All readings +/- 10%

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	3	12 VDC to 14 VDC		Microfuse (no. 36) in A013 or in wiring set
Earth	1			
Speed signal	2	4.7/1.0 VDC	Front PTO stationary (depending on ratchet wheel position)	**A.) Reading: 6.3 VDC** – Fault in component **B.) Reading: 0 VDC** Unplug component and measure at plug If reading is 0 VDC - Fault in A050 (Pin 8 at X1403 separation point) - or fault within wiring set If reading is 6.3 VDC – Fault in component
		approx. 2.1 VDC	Front PTO rotates	
Earth	1			

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Signal	8
Earth	46

NOTE: *see §29*
see §34

Possible cause of fault

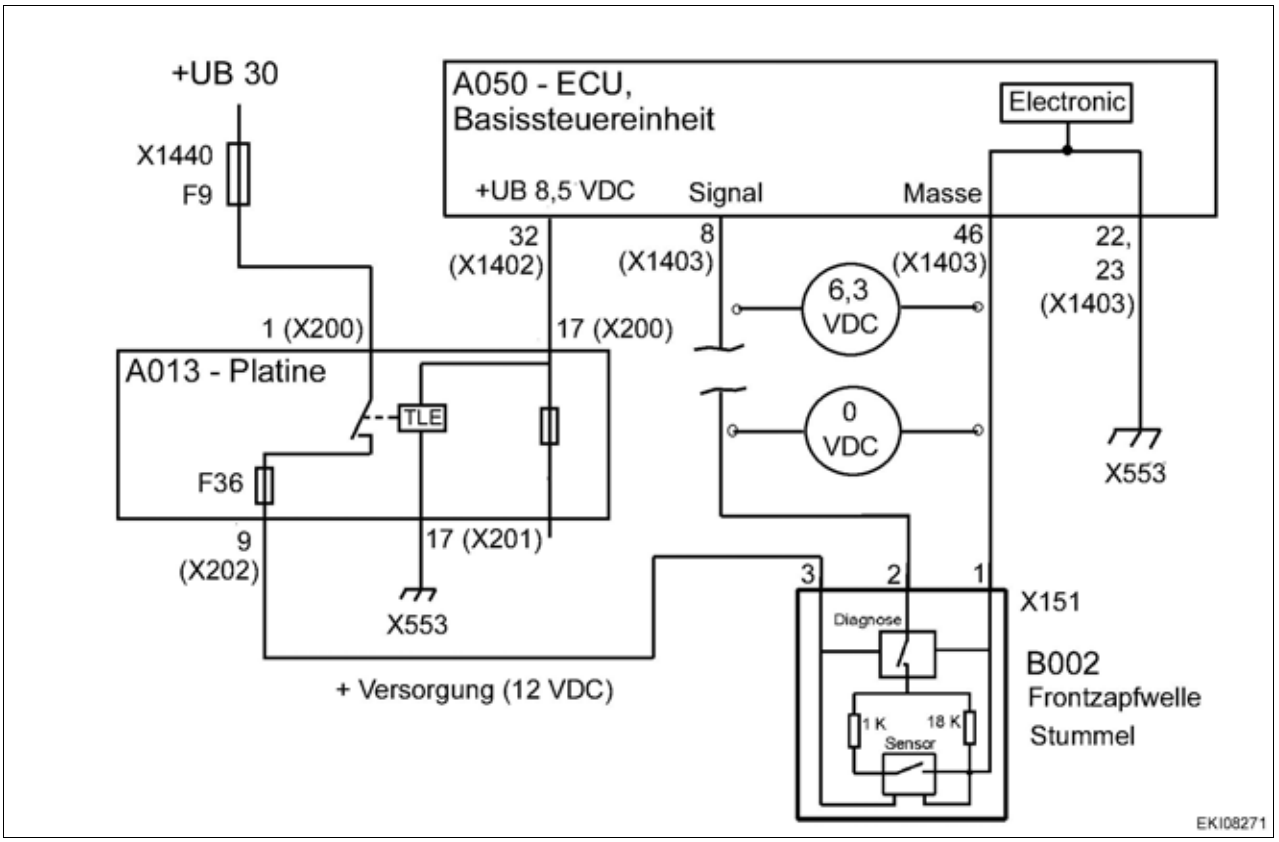


Fig. 165. I002977

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46 B004 vacuum switch (air filter)

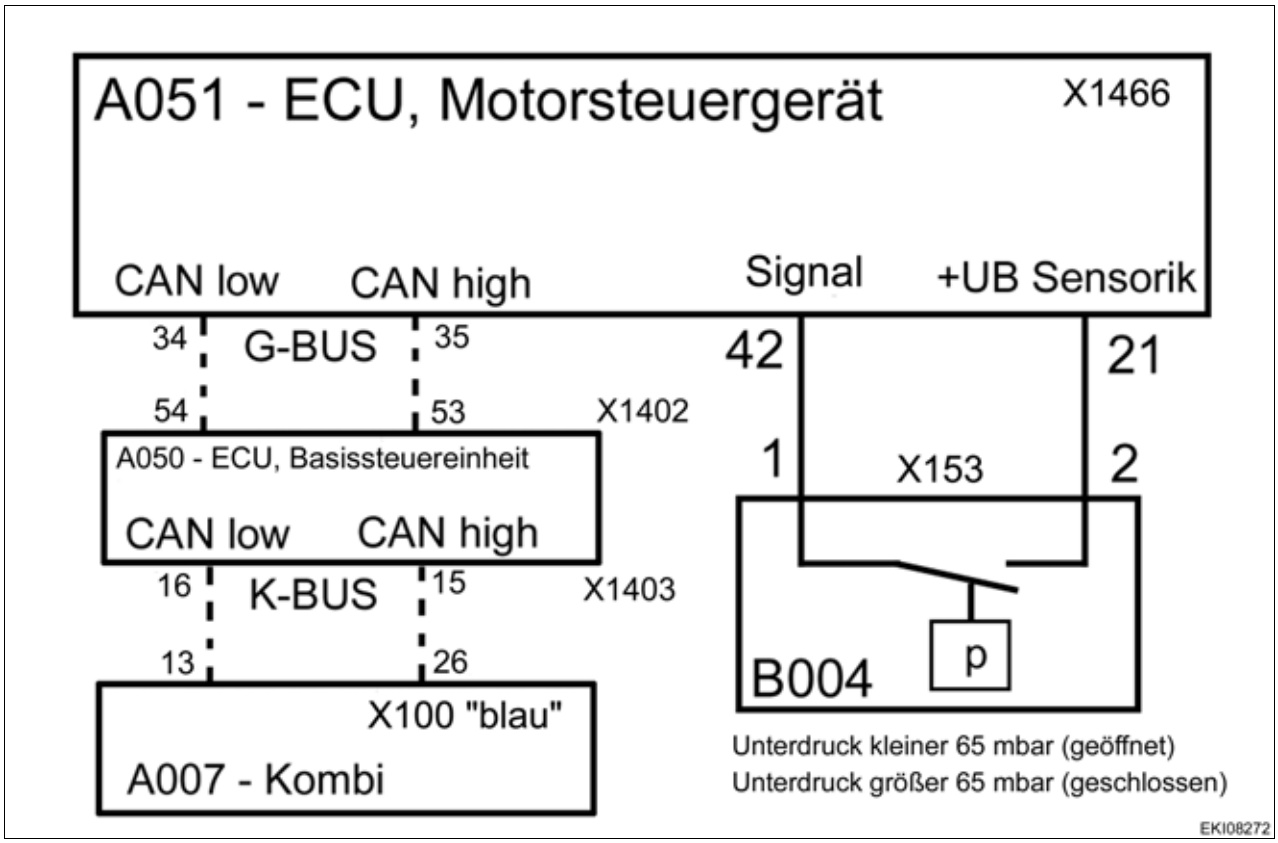


Fig. 166. I002057

Item	Designation	Note
A007 - Instrument panel		
X100	"Blue" separation point on A007 instrument panel	
Pin 13	Control bus_Low	
Pin 26	Control bus_High	
A050 - ECU, basic control unit		
X1402	Separation point (58 pin) on the A050 ECU, basic control unit	
X1403	Separation point (96 pin) on the A050 ECU, basic control unit	
Pin 53 (X1402)	Transmission bus_High	
Pin 54 (X1402)	Transmission-bus_Low	
Pin 15 (X1403)	Control bus_High	
Pin 16 (X1403)	Control bus_Low	
A051 - ECU, engine control unit (EDC 7).		
X1466	Separation point (89 pin) on A051 ECU, EDC engine control unit	
Pin 34	Transmission-bus_Low	
Pin 35	Transmission bus_High	
Pin 21	+ supply (12 VDC) for the B004 vacuum switch	Switch on ignition.
Pin 42	Signal	

Item	Designation	Note
B004 - Vacuum switch (air filter)		
X153	Separation point on B004 vacuum switch	
Pin 1	Signal	
Pin 2	+ supply (12 VDC) for the B004 vacuum switch	

Measuring points and signal values

Measuring points on B004 vacuum switch (air filter)	
Pin	**Function**
1	Signal (vacuum)
2	+ UB sensors

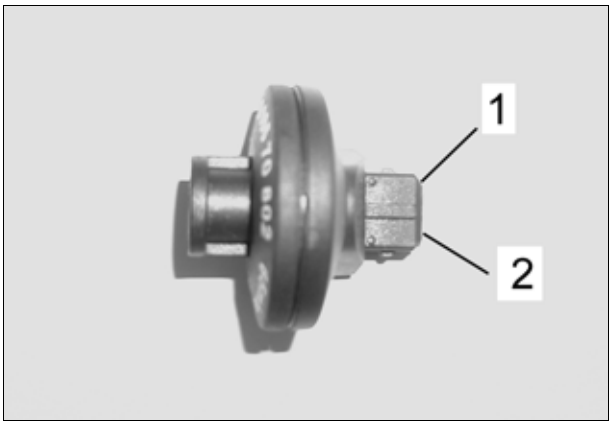


Fig. 167. I000622

NOTE: *Connect the X899.980.246.201 adapter cable directly to the **B004** - Vacuum switch (air filter).*
Ignition ON.
All readings +/- 10%

Resistance measurement

Vacuum	Resistance	Warning message
[mbar]	**[ohms]**	
Less than 65	Infinite (switch open)	-
Greater than 65	approx. 0 (switch closed)	Warning beep and warning message

Voltage measurement

Test	Pin	Specified value	condition	Possible cause of fault
+ UB sensors	2			
		0 VDC	Ignition OFF	
		12 VDC	Ignition ON.	
Vehicle earth				

Test	Pin	Specified value	condition	Possible cause of fault
Signal	1			
Ignition ON.		0 VDC	Vacuum below 65 mbar (switch open)	
		12 VDC	Vacuum above 65 mbar (switch closed)	
Vehicle earth				

Measuring point on the A051 - ECU, engine control unit (EDC 7). (X1466 separation point)	
Function	**Pin**
+ UB sensors	21
Signal	42

NOTE: *see §36*
see §37

Check the warning message on A007 - Instrument panel
Disconnect X153 separation point from **B004** - Vacuum switch (air filter)
Connect X 899.980.246.201 adapter cable to the X153 separation point only
Connect pin 1 to pin 2
Switch on ignition.
The error message appears on **A007** - Instrument panel

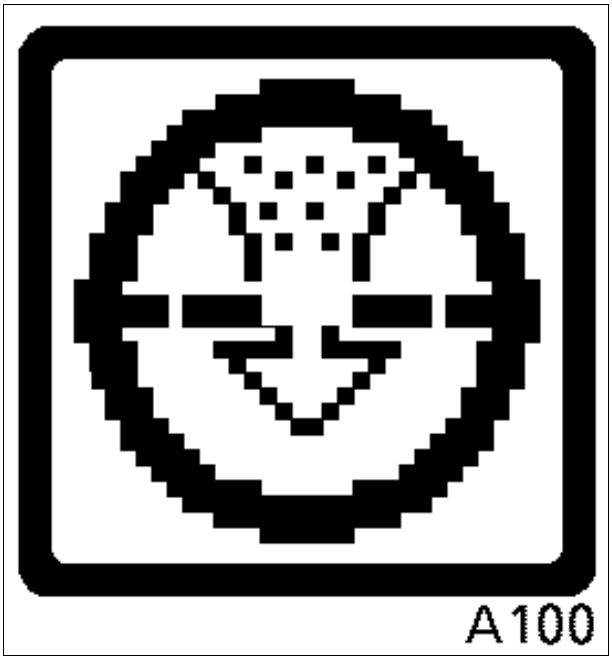


Fig. 168. I000395

47 B008 sensor, high pressure 1

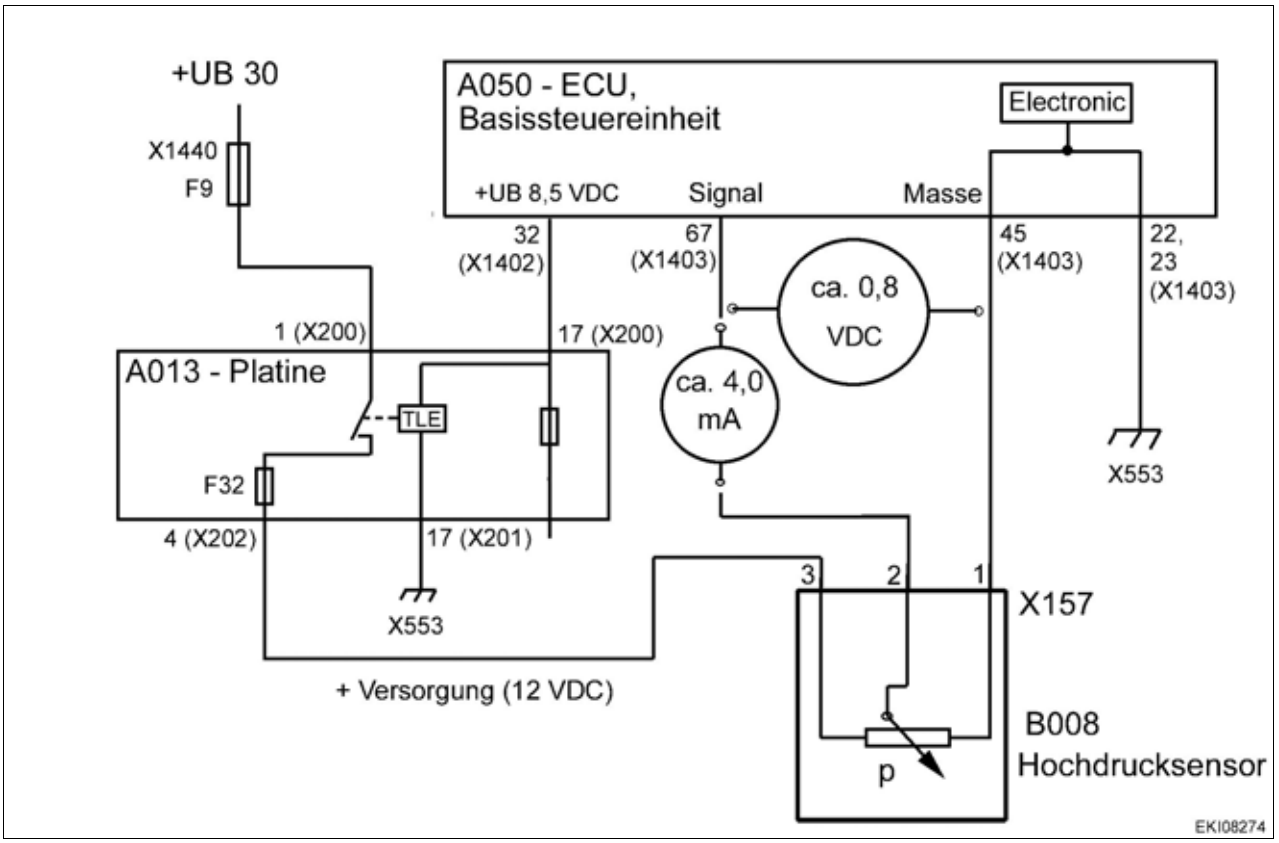


Fig. 169. I001928

Item	Designation	Note
A013 - PCB, microfuses **(microfuse no. 32)**		
X200	Separation point on A013 PCB_microfuse	
X201	Separation point on A013 PCB_microfuse	
X202	Separation point on A013 PCB_microfuse	
Pin 1 (X200)	+ supply for the A013 PCB_microfuse (12 VDC)	
Pin 17 (X200)	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 17 (X201)	Earth	
Pin 4 (X202)	+ supply for the B008 sensor, high pressure (12 VDC)	Switch on ignition.
A050 - ECU, basic control unit		
X1402	Separation point on the A050 ECU, basic control unit	
X1403	Separation point on the A050 ECU, basic control unit	
Pin 32 (X1402)	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 67 (X1403)	Signal	
Pin 45 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
B008 - Sensor, high-pressure 1		
X157	Separation point on the B008 sensor, high pressure 1	
Pin 1	Earth	
Pin 2	Signal	Depending on transmission high pressure

Item	Designation	Note
Pin 3	+ supply (12 VDC)	Switch on ignition.
X553 earth pin		
X1440 fuse holder		

Measuring points and signal values

Measuring points on the B008 - Sensor, high-pressure 1	
Pin	**Function**
1	Earth
2	Signal
3	+ supply

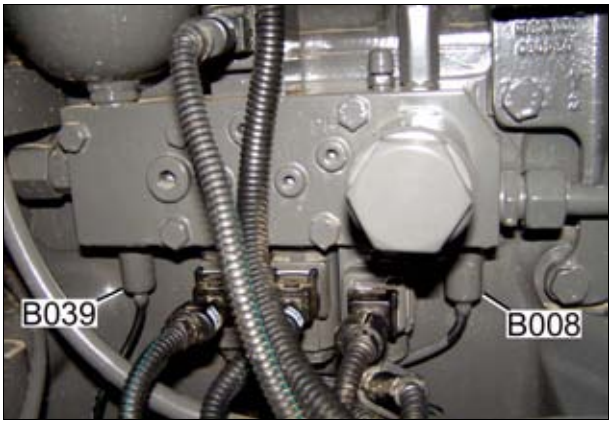


Fig. 170. I001057

NOTE: *Connect the X899.980.246.205 adapter cable directly to the **B008** - Sensor, high-pressure 1.*
Ignition ON.
All readings +/- 10%

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	3	12 VDC to 14 VDC		Microfuse (no. 32) in A013 or in wiring set
Earth	1			
Signal	2	approx. 0.8 VDC	0 bar (transmission in neutral)	
Earth	1			

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Signal	67
Sensor system earth	45

NOTE: *Draw out bridge at pin 67 (X1403) on X899.980.304.000 adapter box. Measure pin 67 with an ammeter. Switch on ignition.*
see §31
see §34

WARNING: The following test requires the tractor to be jacked up on all four wheels. (Risk of accident)

- Leave engine running.
- Engage travel range II.
- Actuate hand and foot brake.
- Engine speed: 1600 rpm.
- Select a forward or reverse ratio.

CAUTION: Perform high-pressure test for max. 5 seconds (oil heating).

B008 high pressure sensor (approx. values)		
Pressure in transmission (engine speed above 1400 rpm)	**Signal voltage**	**Current draw**
0 bar (Transmission in neutral)	0.80 VDC	4.0 mADC
30 bar (Transmission in ACTIVE STATIONARY)	0.94 VDC	4.7 mADC
100 bar	1.37 VDC	6.7 mADC
200 bar	1.90 VDC	9.2 mADC
300 bar	2.50 VDC	12.0 mADC
400 bar	3.00 VDC	14.8 mADC
560 bar (Switch-off pressure)	3.80 VDC	18.7 mADC

Transmission high-pressure test on Vario terminal
NOTE: *see §10*

Transmission high-pressure test using a manometer (min. 600 bar) (more precise)
NOTE: *see §3*

48 B009 sensor, discharge temperature

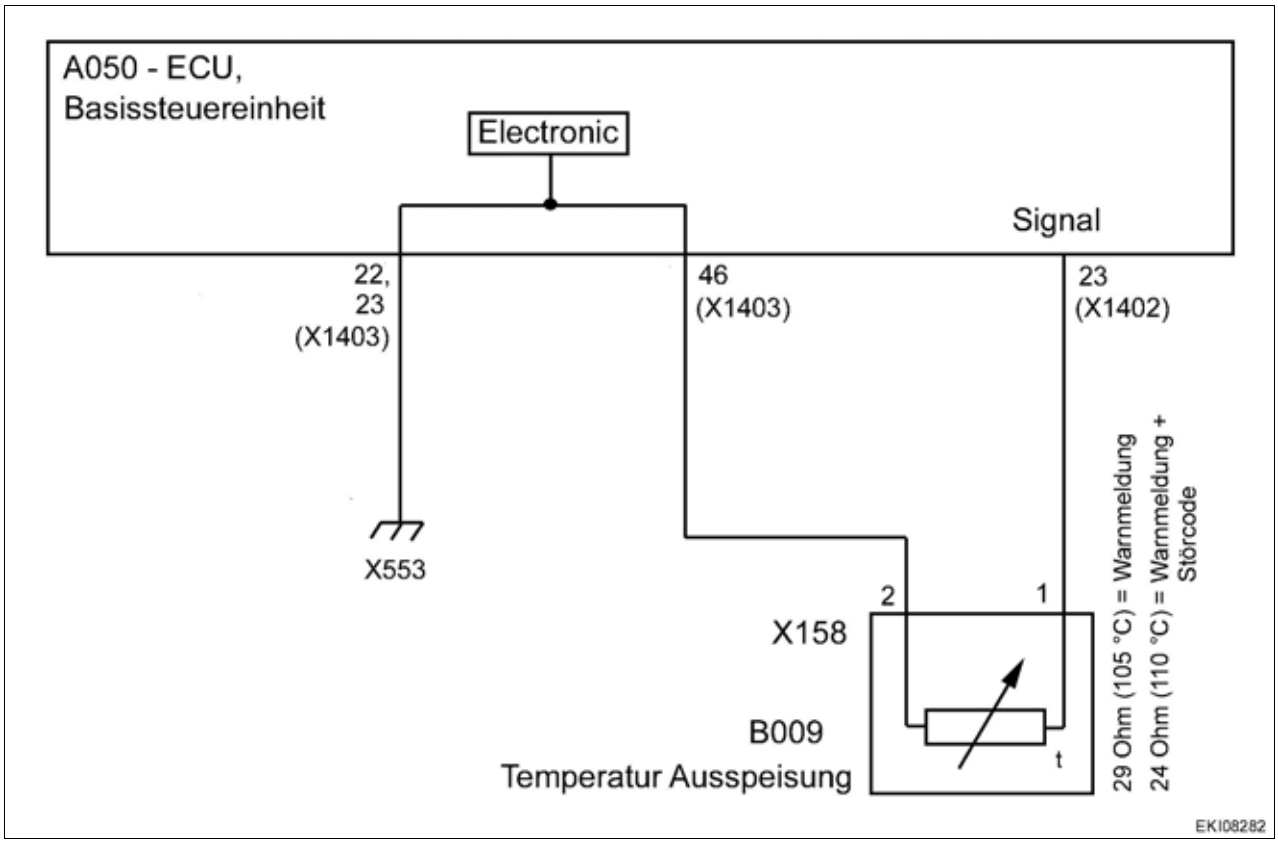


Fig. 171. I001931

Item	Designation	Note
A050 - ECU, basic control unit		
X1402	Separation point on the A050 ECU, basic control unit	
X1403	Separation point on the A050 ECU, basic control unit	
Pin 23 (X1402)	Signal	
Pin 46 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
B009 - Discharge temperature sensor		
X158	Separation point on B009 sensor	
Pin 1	Signal	
Pin 2	Earth	
X553 earth pin		

Measuring points and signal values

Measuring points on the B009 - Discharge temperature sensor	
Pin	**Function**
1	Signal
2	Earth

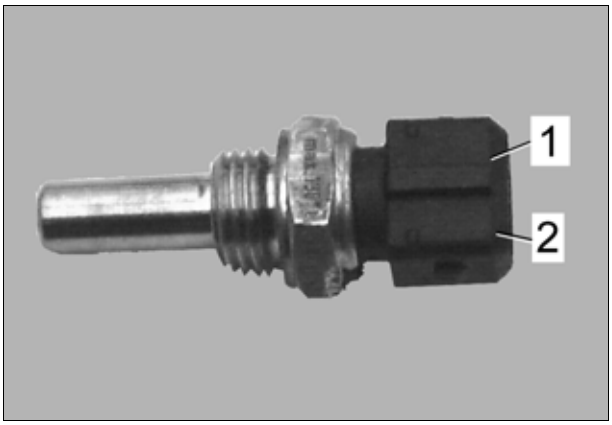


Fig. 172. I000637

Read Vario terminal display for **B009** - Discharge temperature sensor
NOTE: *see §10*

Checking the **B009** - Discharge temperature sensor

NOTE: *Connect the X899.980.246.201 adapter cable directly to the **B009** - Discharge temperature sensor.*
Heat up sensor in water bath



Fig. 173. I000730

B009 sensor (approx. values)		
Temperature	**Resistance**	**Fault code**
50 °C	210 ohms	
60 °C	147 ohms	
87 °C	51 ohms	
100 °C	37 ohms	
105 °C	29 ohms	Warning message
110 °C	24 ohms	Warning message + fault code 04.1.53

Measuring point on A050 - ECU, basic control unit (X1402 + X1403 separation points)	
Function	**Pin**
Signal	23 (X1402)
Earth	46 (X1403)

NOTE: *see §31*
see §34

Check temperature warning in A007 - Instrument panel

Connect X899.980.246.201 adapter cable to X158 separation point (connection to B009 sensor remains severed)
Connect X890.980.224.000 resistance decade
Switch on ignition.
Select a resistance of 24 ohms (110 °C) (see table)

NOTE: *Allow preconditioning time of approx. 1 minute.*

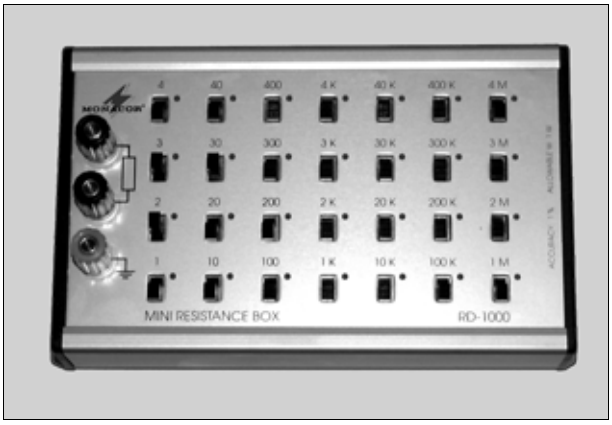


Fig. 174. I000639

The transmission oil temperature warning message appears in the A007 instrument panel
Fault code 04.1.53 is also stored

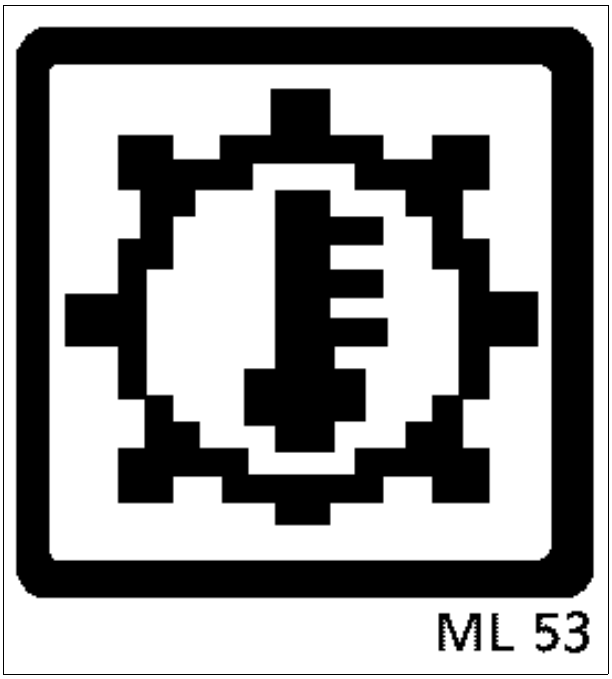


Fig. 175. I000394

Possible causes (selection) of excessive transmission oil temperature

Possible cause (selection)	Remedy
Radiator contaminated	Clean radiator
Oil level below minimum	Check transmission oil and top up
Too high travel range selected	Switch from travel range 2 (road) to travel range 1 (field) if necessary
Too high acceleration rate (I, II, III, IV) selected	Reduce acceleration rate if necessary
Too high cruise control speed selected	Reduce cruise control speed if necessary

49 B010 sensor, engine speed

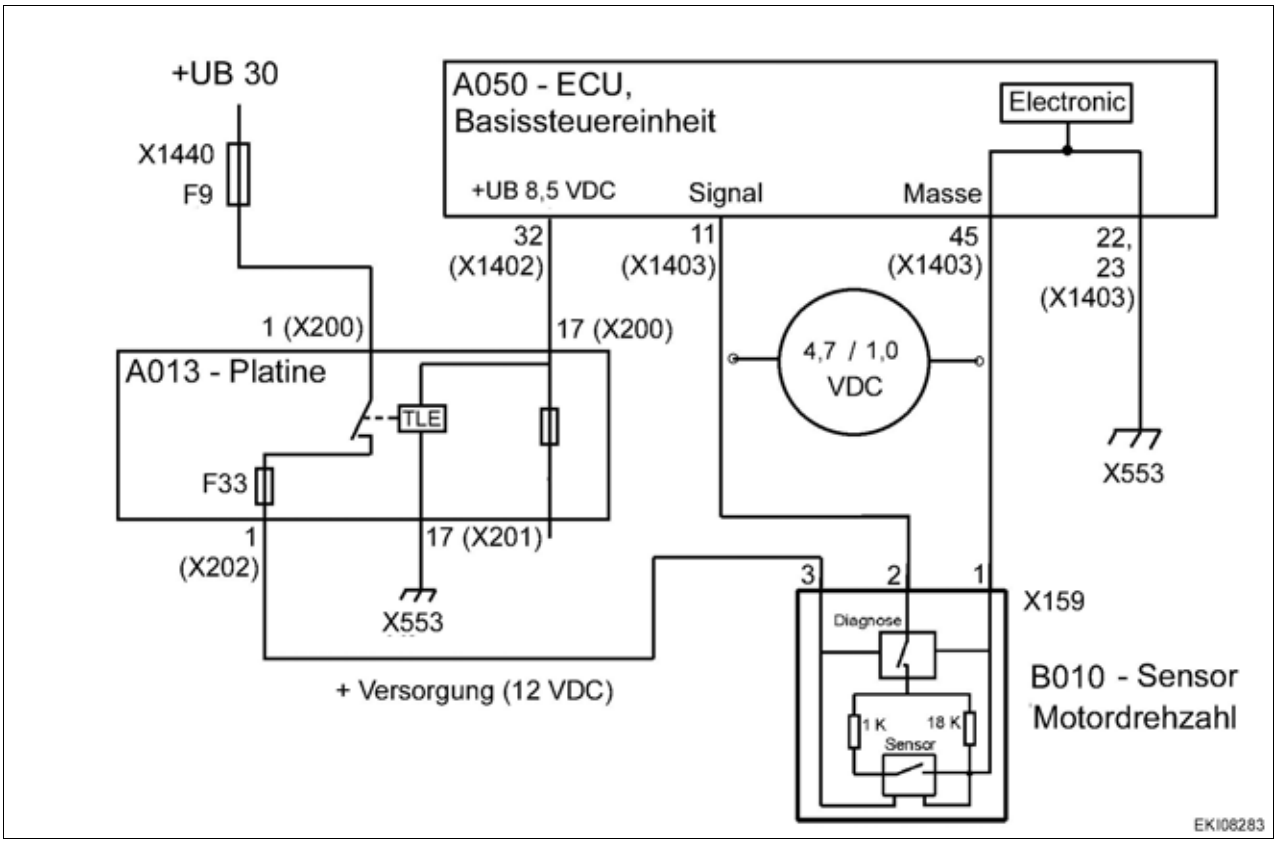


Fig. 176. I001934

Item	Designation	Note
A013 - PCB, microfuses **(microfuse no. 33)**		
X200	Separation point on A013 PCB_microfuse	
X201	Separation point on A013 PCB_microfuse	
X202	Separation point on A013 PCB_microfuse	
Pin 1 (X200)	+ supply for the A013 PCB_microfuse (12 VDC)	
Pin 17 (X200)	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 17 (X201)	Earth	
Pin 1 (X202)	+ supply for the B010 sensor, engine speed	Switch on ignition.
A050 - ECU, basic control unit		
X1402	Separation point on the A050 ECU, basic control unit	
X1403	Separation point on the A050 ECU, basic control unit	
Pin 32 (X1402)	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 11 (X1403)	Signal	When stationary, depending on ratchet wheel position
Pin 45 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
B010 - Sensor, engine speed		
X159	Separation point on B010 sensor	

Item	Designation	Note
Pin 1	Earth	
Pin 2	Signal	When stationary, depending on ratchet wheel position
Pin 3	+ supply (12 VDC)	Switch on ignition.

Measuring points and signal values

Measuring points on B010 sensor, engine speed	
Pin	**Function**
1	Earth
2	Signal
3	+ supply

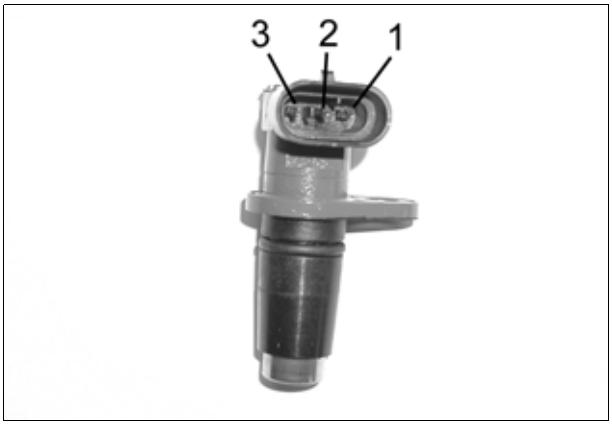


Fig. 177. I000616

NOTE: *Connect the X899.980.246.205 adapter cable directly to the **B010** - Sensor, engine speed.*
Ignition ON.
All readings +/- 10%

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	3	12 VDC to 14 VDC		Microfuse (no. 33) in A013 or in wiring set
Earth	1			
Speed signal	2	approx. 1.4 VDC	Engine running	**A.) Reading: 6.3 VDC** – Fault in component **B.) Reading: 0 VDC** Unplug component and measure at plug If reading is 0 VDC - Fault in A050 (Pin 11 at X1403 separation point) - or fault within wiring set If reading is 6.3 VDC – Fault in component
		4.7 VDC or 1.0 VDC	Engine stationary (depending on ratchet wheel position)	
Earth	1			

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Signal	11
Sensor system earth	45

NOTE: *see §31*
see §34

Possible cause of fault

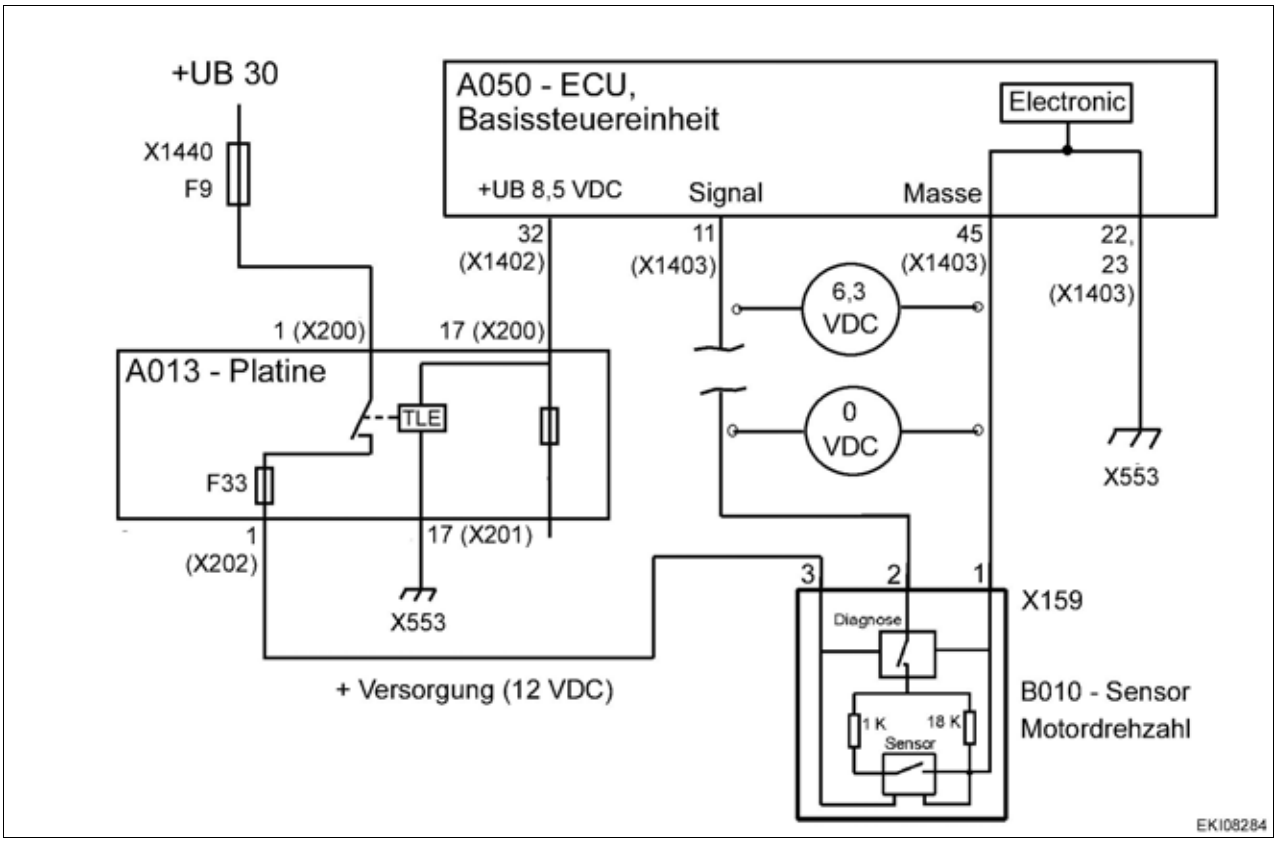


Fig. 178. I001935

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50 B013 hydraulic oil temperature sensor

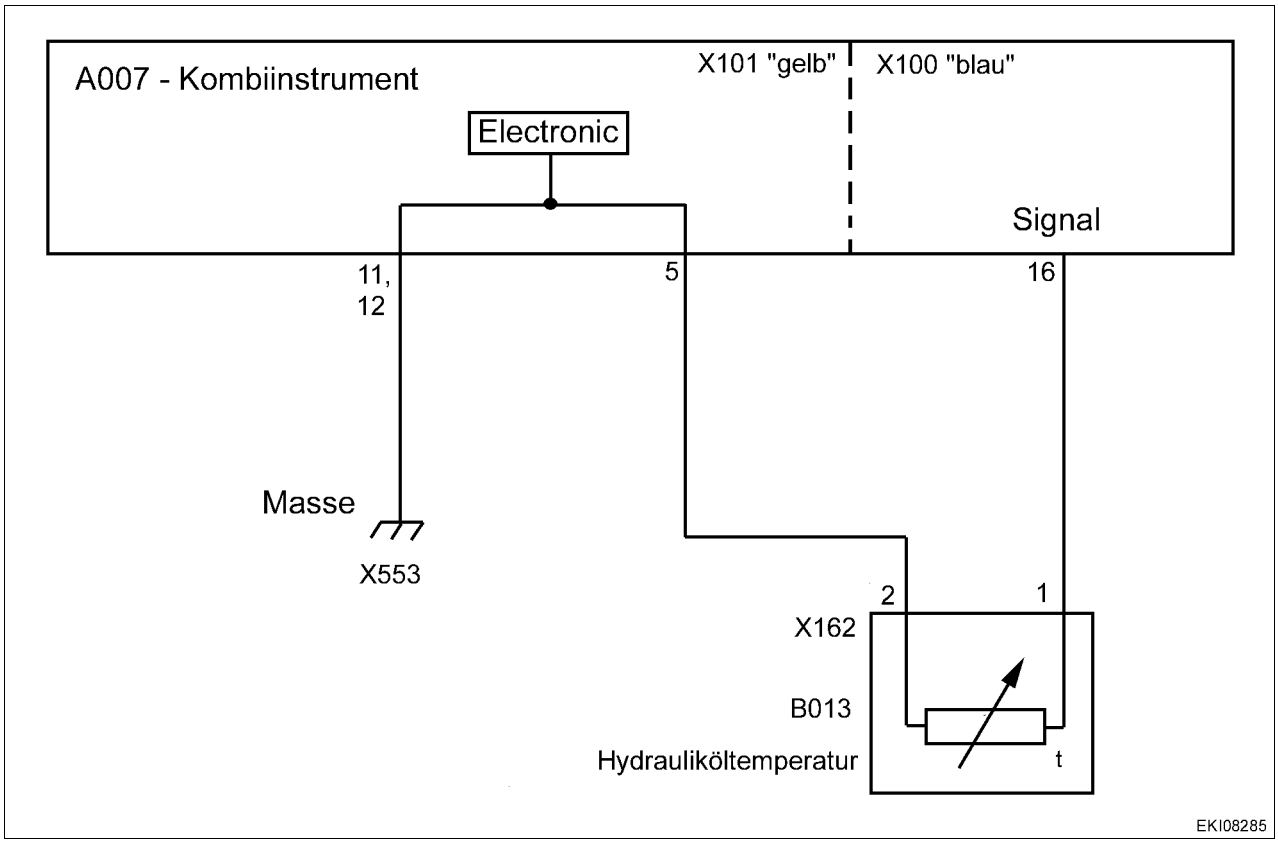


Fig. 179. I002392

Item	Designation	Note
A007 - Instrument panel		
X100	"Blue" separation point on A007 instrument panel	
X101	"Yellow" separation point on A007 instrument panel	
Pin 16 (X100 "blue")	Signal	
Pin 5 (X101 "yellow")	Sensor system earth	
Pin 11 (X101 "yellow")	Earth	
Pin 12 (X101 "yellow")	Electronics earth	
B013 - Sensor, hydraulic oil temperature		
X162	Separation point on B013-Sensor	
Pin 1	Signal	
Pin 2	Earth	
X553 earth pin		

Measuring points and signal values

Measuring points on the B013 - Sensor, hydraulic oil temperature	
Pin	**Function**
1	Signal
2	Earth

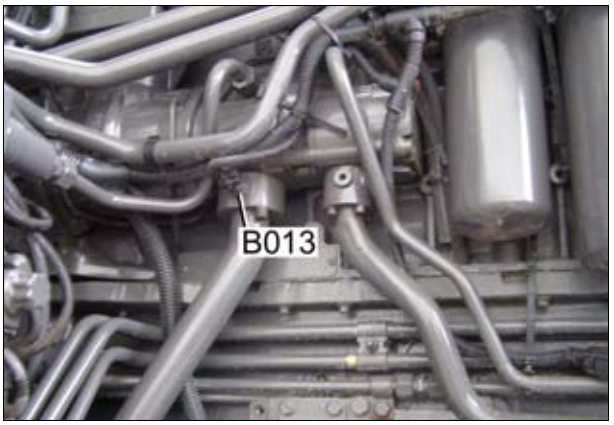


Fig. 180. I001061

Checking the **B013** - Sensor, hydraulic oil temperature

NOTE: *Connect the X899.980.246.201 adapter cable directly to the **B013** - Sensor, hydraulic oil temperature. Heat up sensor in water bath*



Fig. 181. I000730

Hydraulic oil temperature (°C)	Resistance	Display on A007 instrument panel
-40	45.3 Kohms	
-30	26.1 Kohms	
-10	9.4 Kohms	
-5	7.4 Kohms	Preheating of hydraulic oil ON
0	5.9 Kohms	
5	4.7 Kohms	
10	3.8 Kohms	
20	2.5 Kohms	
25	2.1 Kohms	
30	1.7 Kohms	Preheating of hydraulic oil OFF
40	1.2 Kohms	
50	800 ohms	
60	600 ohms	
70	400 ohms	
74	380 ohms	
78	340 ohms	
82	300 ohms	
86	260 ohms	
90	240 ohms	
94	210 ohms	

Hydraulic oil temperature (°C)	Resistance	Display on A007 instrument panel
98	**190 ohms**	**Warning message**
102	170 ohms	
106	150 ohms	
110	140 ohms	
113	130 ohms	

Connect X899.980.208.100 e-adapter box to the A007 instrument panel using X899.980.208.204 adapter cable	
Pin at separation point	Pin on the adapter box (68-pin)
X101 separation point "yellow" (1 to 26)	1 to 26
X100 separation point "blue" (1 to 26)	31 to 56

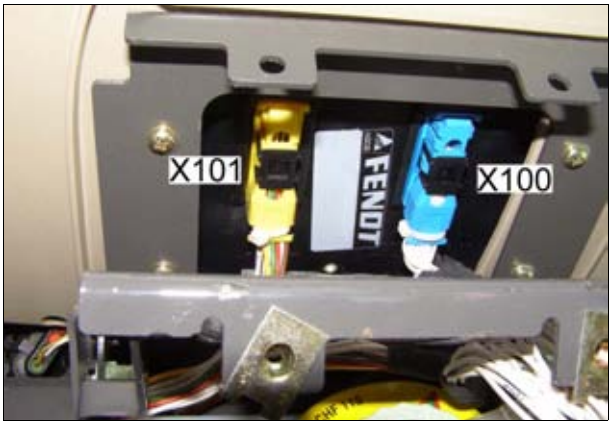


Fig. 182. I001226

NOTE: *see §1*

Check temperature warning in A007 instrument panel
Connect X899.980.246.201 adapter cable to X162 separation point (connection to B013 sensor remains severed)
Connect X890.980.224.000 resistance decade
Switch on ignition.
Start engine.
Select a resistance of 190 ohms (98 °C) (see table)

NOTE: *Start engine.*
Allow preconditioning time of approx. 1 minute.

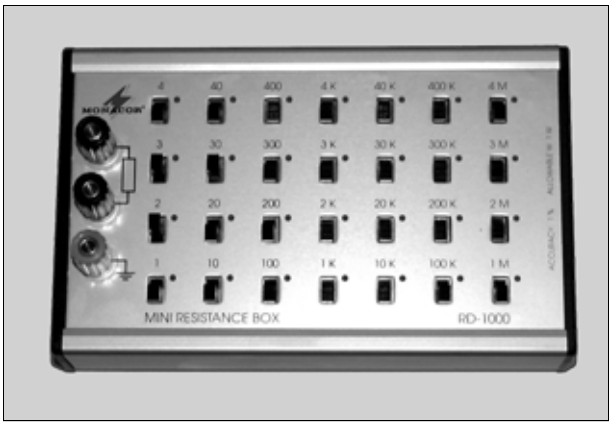


Fig. 183. I000639



The warning message "Hydraulic oil temperature too high" will appear in the A007 instrument panel
Display accompanied by a continuous beep and warning light

Possible causes (selection) of excessive hydraulic oil temperature

Possible cause (selection)	Remedy
Auxiliary control valve not set to "Neutral" for hydraulic operations	Set auxiliary control valve to "Neutral" and lock Measure and check Y auxiliary control valve where applicable
Three-point implement is non-standard; lateral support setting too narrow	Adapt three-point implement in line with standard; modify lateral support. If necessary make lifting struts longer, if lifting height is sufficient

Possible cause (selection)	Remedy
Three-point implement too heavy. Pressure-limiting valve (DBV) continuously activated in upper limit position of power lift.	Connect top link to a different point; measure pressure during the lifting process where necessary
Insufficient oil supply for the operation concerned	Check and replenish hydraulic oil
Flow rate on auxiliary control valve not set to optimum	Adjust flow rate

51 B014 sensor, hydrostatic collecting shaft

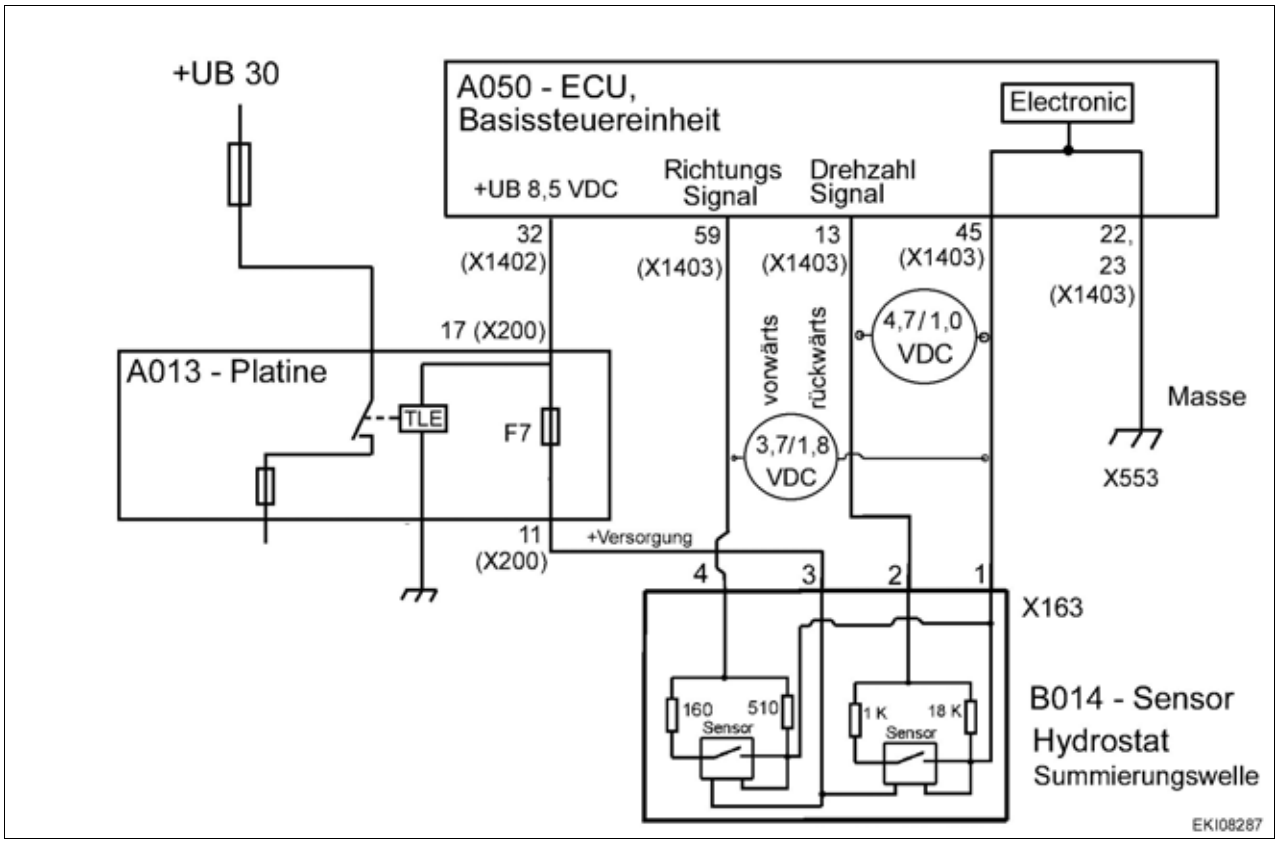


Fig. 184. I001936

Item	Designation	Note
A013 - PCB, microfuses **(microfuse no. 7)**		
X200	Separation point on A013 PCB_microfuse	
Pin 17	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 11	+ supply for the B014 sensor	Switch on ignition.
A050 - ECU, basic control unit		
X1402	Separation point on the A050 ECU, basic control unit	
X1403	Separation point on the A050 ECU, basic control unit	
Pin 32 (X1402)	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 13 (X1403)	Signal, speed	
Pin 59 (X1403)	Signal, rotational direction	
Pin 45 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
B014 - Sensor, collecting shaft		
X163	Separation point on B014 sensor	
Pin 1	Earth	
Pin 2	Signal, speed	
Pin 3	+ supply	Switch on ignition.

Item	Designation	Note
Pin 4	Signal, rotational direction	
X553 earth pin		

Measuring points and signal values

Measuring points on B014 sensor, hydrostatic collecting shaft	
1	Earth
2	Signal, speed
3	+ supply (8.5 VDC)
4	Signal, rotational direction

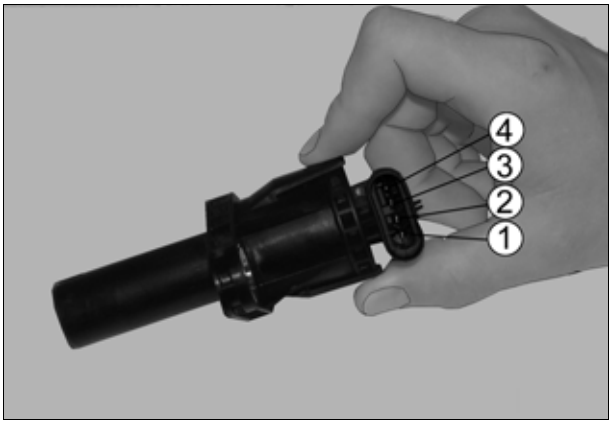


Fig. 185. I000642

NOTE: *Connect the X899.980.246.206 adapter cable directly to the **B014** - Sensor, collecting shaft.*
Ignition ON.
All readings +/- 10%

Test	Pin	Specified value	condition	Possible cause of fault
+ supply Earth	3 1	8.5 VDC		Microfuse (no. S7) in A013 PCB or in wiring set
Signal, speed Earth	2 1	4.7/1.0 VDC 2.8 VDC	Tractor stationary (depending on ratchet wheel setting) Tractor moving	**A.) Reading: 6.3 VDC** – Fault in component **B.) Reading: 0 VDC** Unplug component and measure at plug If reading is 0 VDC - Fault in A050 (pin 13 to X1403 separation point) – or in wiring set If reading is 6.3 VDC – Fault in component
Signal, rotational direction Earth	4 1	3.7 VDC 1.8 VDC	Tractor advancing Tractor reversing	**A.) Reading: 6.1 VDC** – Fault in component **B.) Reading: 0 VDC** Unplug component and measure at plug If reading is 0 VDC - Fault in A050 (pin 59 to X013 separation point) – or in wiring set If reading is 6.1 VDC – Fault in component

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Signal, speed	13
Signal, rotational direction	59
Sensor system earth	45

NOTE: *see §31*
see §34

Possible cause of fault

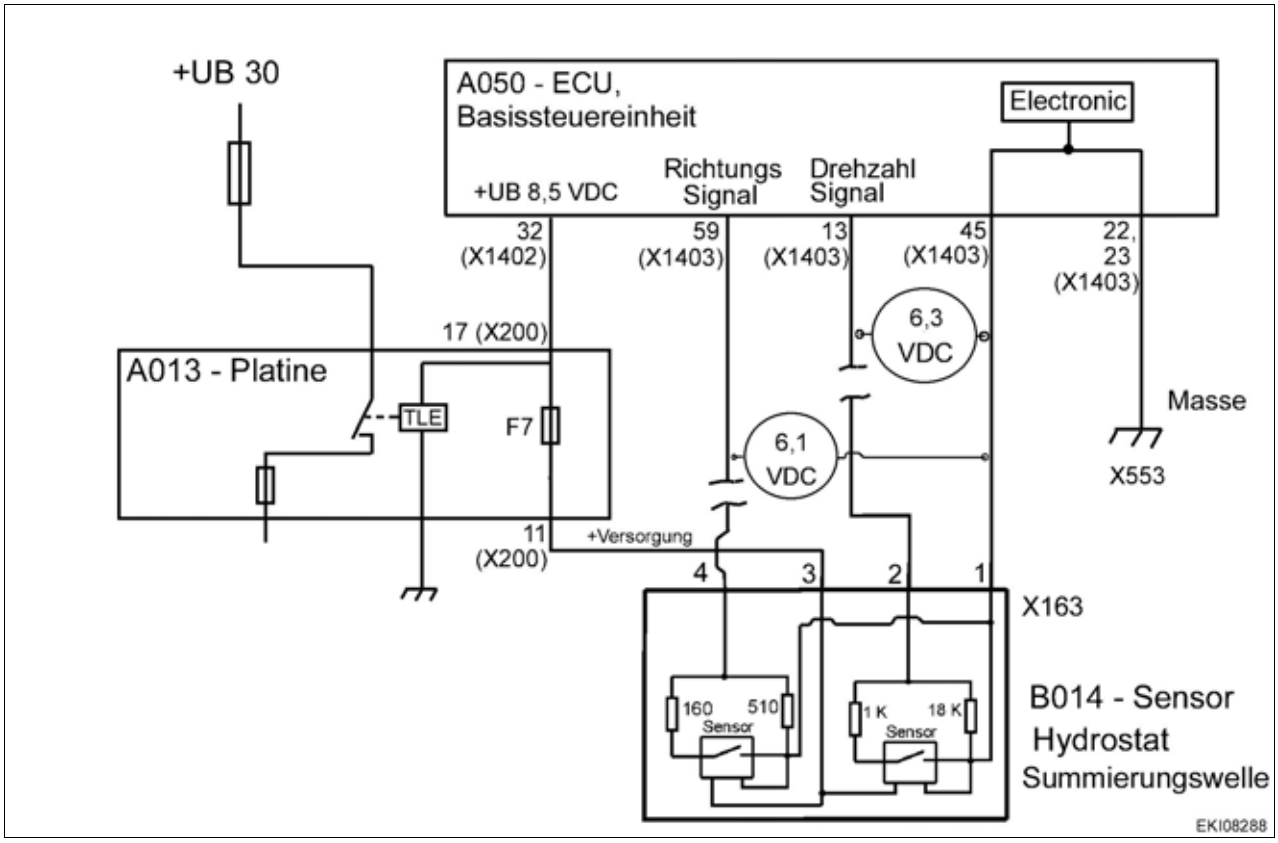


Fig. 186. I001937

NOTE: *B014 - Sensor, Hydrostat Summierungswelle einbauen*

52 B015 sensor, bevel pinion

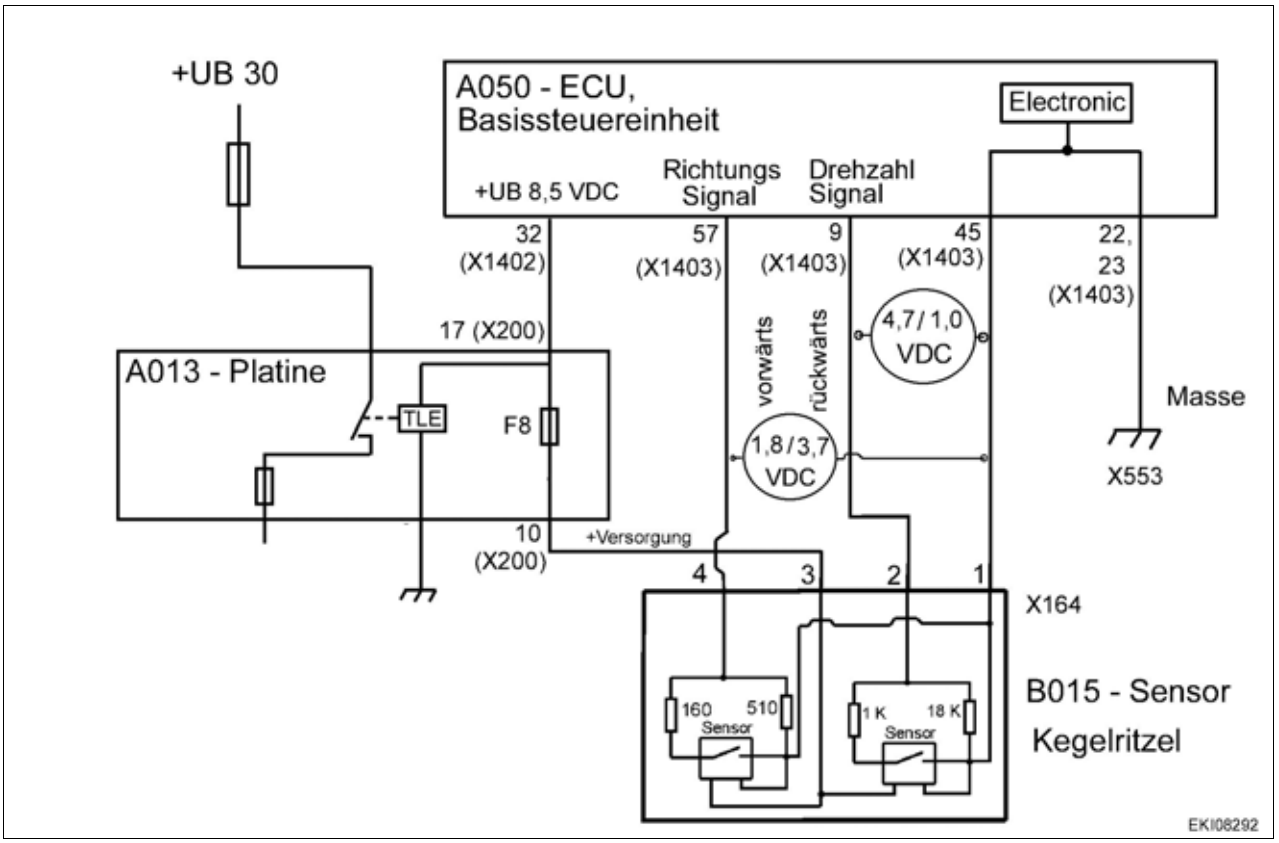


Fig. 187. I001939

Item	Designation	Note
A013 - PCB, microfuses (microfuse no. 8)		
X200	Separation point on **A013** - PCB, microfuses	
Pin 17	+ supply for the **A013** - PCB, microfuses (8.5 VDC)	Switch on ignition.
Pin 10	+ supply for the **B015** - Sensor, bevel pinion	Switch on ignition.
A050 - ECU, basic control unit		
X1402	Separation point on **A050** - ECU, basic control unit	
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 32 (X1402)	+ supply for the **A013** - PCB, microfuses (8.5 VDC)	Switch on ignition.
Pin 9 (X1403)	Signal, speed	
Pin 57 (X1403)	Signal, rotational direction	
Pin 45 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
B015 - Sensor, bevel pinion		
X164	Separation point on **B015** - Sensor, bevel pinion	
Pin 1	Earth	
Pin 2	Signal, speed	
Pin 3	+ supply	Switch on ignition.

Item	Designation	Note
Pin 4	Signal, rotational direction	
X553 earth pin		

Measuring points and signal values

Measuring points on the B015 - Sensor, bevel pinion	
1	Earth
2	Signal, speed
3	+ supply (8.5 VDC)
4	Signal, rotational direction

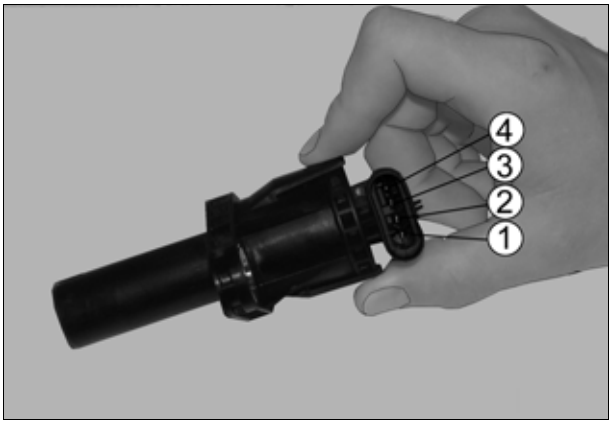


Fig. 188. I000642

NOTE: *Connect the X899.980.246.206 adapter cable directly to the **B015** - Sensor, bevel pinion.*
Ignition ON.
All readings +/- 10%

Test	Pin	Specified value	condition	Possible cause of fault
+ supply Earth	3 1	8.5 VDC		Microfuse (no. 8) in **A013** - PCB, microfuses or in wiring set
Signal, speed Earth	2 1	4.7/1.0 VDC 3.0 VDC	Tractor stationary (depending on ratchet wheel setting) Tractor moving	**A.) Reading: 6.3 VDC** – Fault in component **B.) Reading: 0 VDC** Unplug component and measure at plug If reading is 0 VDC – Fault in A050 (pin 9 on X1403 separation point) – or in wiring set If reading is 6.3 VDC – Fault in component
Signal, rotational direction Earth	4 1	1.8 VDC 3.7 VDC	Tractor advancing Tractor reversing	**A.) Reading: 6.1 VDC** – Fault in component **B.) Reading: 0 VDC** Unplug component and measure at plug If reading is 0 VDC – Fault in A050 (pin 57 on X013 separation point) – or in wiring set If reading is 6.1 VDC – Fault in component

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Signal, speed	9
Signal, rotational direction	57
Sensor system earth	45

NOTE: *see §31*
see §34

Possible cause of fault

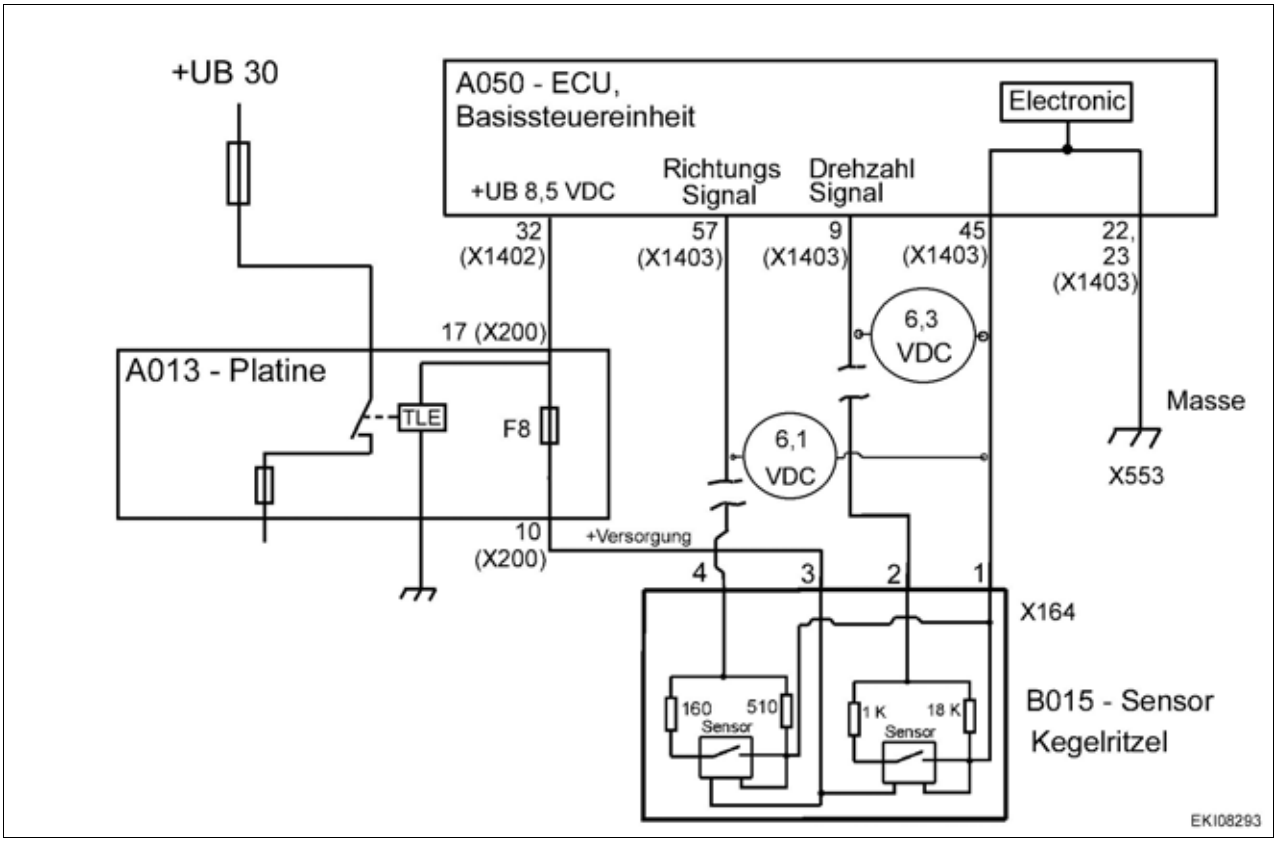


Fig. 189. I001940

NOTE: *B015 - Sensor, Kegelritzel einbauen*

53 B016 sensor, travel range detection

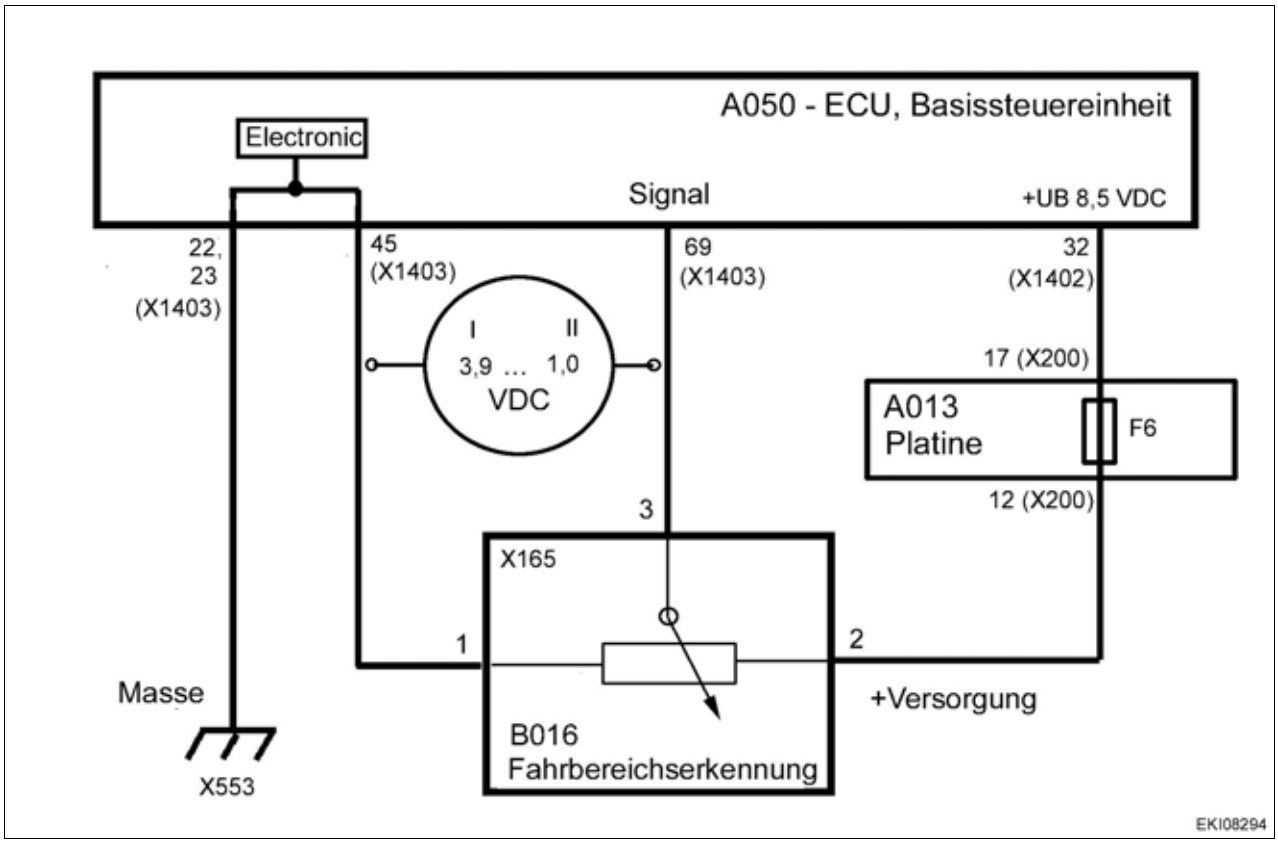


Fig. 190. I001941

Item	Designation	Note
A013 - PCB, microfuses **(microfuse no. 6)**		
X200	Separation point on A013 PCB_microfuse	
Pin 17	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 12	+ supply for the B016 sensor (8.5 VDC)	Switch on ignition.
A050 - ECU, basic control unit		
X1402	Separation point on the A050 ECU, basic control unit	
X1403	Separation point on the A050 ECU, basic control unit	
Pin 32 (X1402)	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 69 (X1403)	Signal	
Pin 45 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
B016 - Sensor, travel range detection		
X165	Separation point on B016 sensor	
Pin 1	Earth	
Pin 2	+ supply (8.5 VDC)	Switch on ignition.
Pin 3	Signal	
X553 earth pin		

Measuring points and signal values

Measuring points on the B016 - Sensor, travel range detection Travel range I (field), travel range II (road)	
Pin	**Function**
1	Earth
2	+ supply
3	Signal

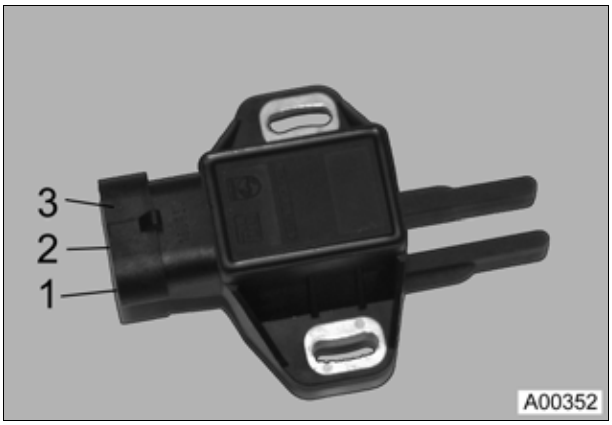


Fig. 191. I001451

NOTE: *Connect the X899.980.246.205 adapter cable directly to the **B016** - Sensor, travel range detection.*
Ignition ON.
All readings +/- 10%

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	2	8.5 VDC		Microfuse (no. 6) in A013 or within wiring set
Earth	1			
Signal	3	3.9 VDC	Travel range I (field)	
		1.0 VDC	Travel range II (road)	
Earth	1			

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Signal	69
Sensor system earth	45

NOTE: *see §31*
see §34

Measuring power consumption
Draw out bridge at pin 69 (at X1403) on adapter box.
Measure pin 69 with multimeter (ampere meter).
Travel range I = 19 mADC
Travel range II = 5 mADC

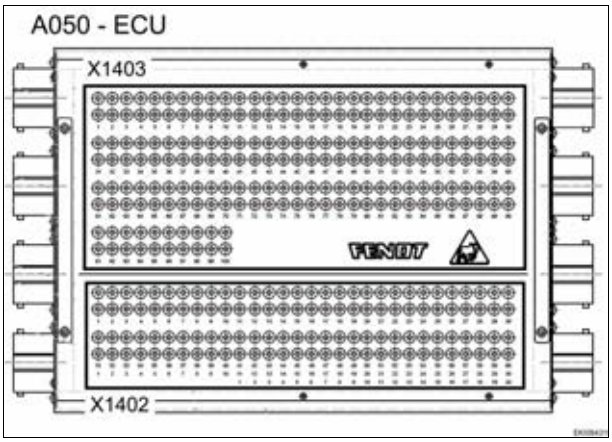


Fig. 192. I001874

Possible cause of fault

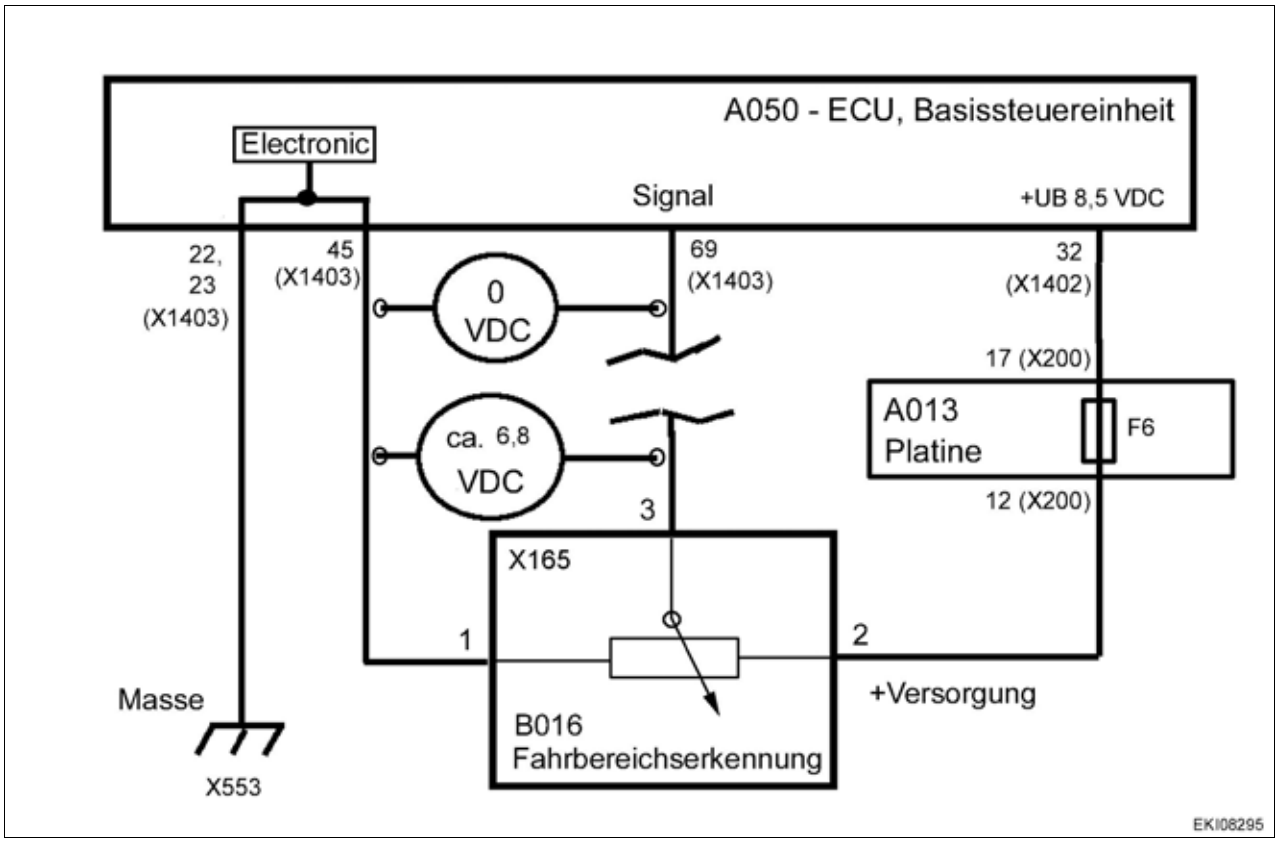


Fig. 193. I001942

NOTE: *The B016 sensor, travel range detection must be calibrated*
see §13

54 B017 sensor, clutch pedal

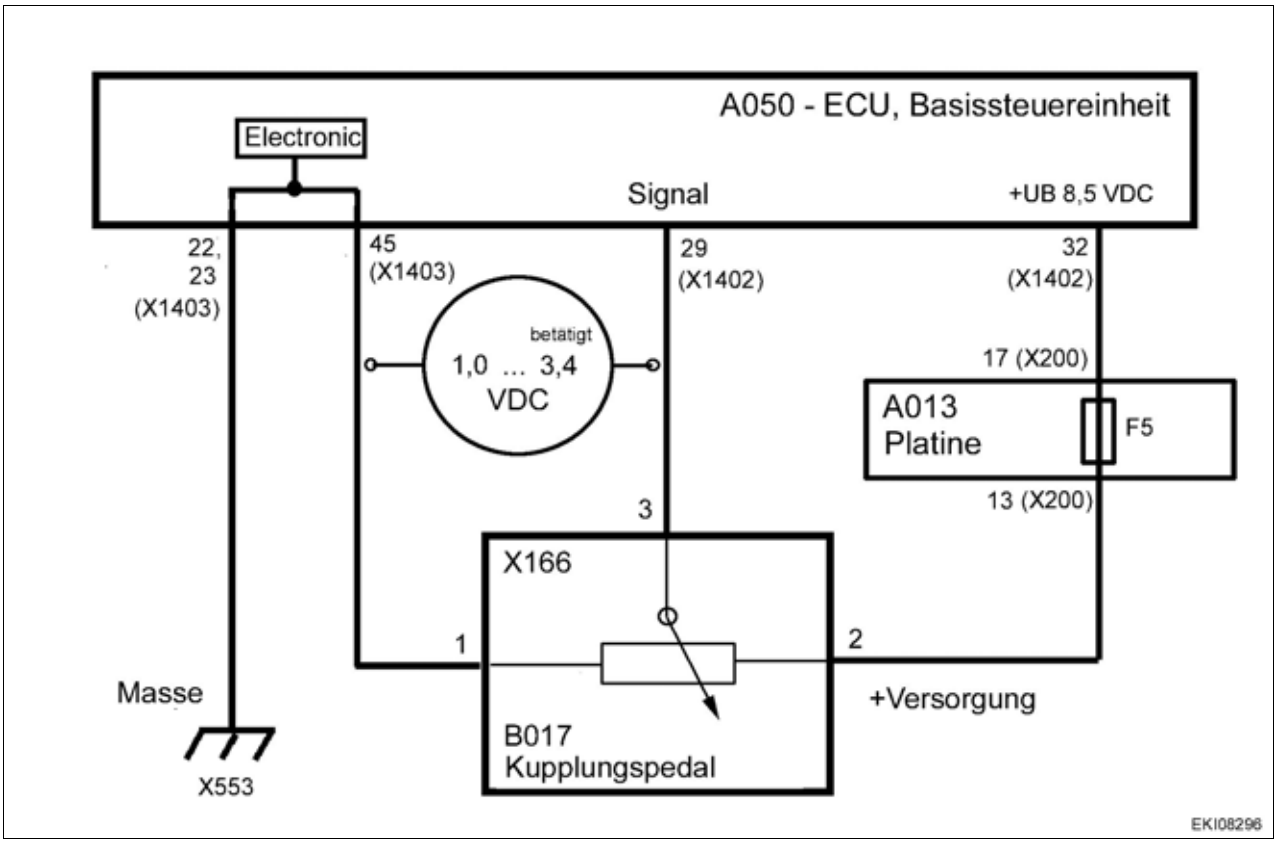


Fig. 194. I001943

Item	Designation	Note
A013 - PCB, microfuses **(microfuse no. 6)**		
X200	Separation point on A013 PCB_microfuse	
Pin 17	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 13	+ supply for the B017 sensor (8.5 VDC)	Switch on ignition.
A050 - ECU, basic control unit		
X1402	Separation point on the A050 ECU, basic control unit	
X1403	Separation point on the A050 ECU, basic control unit	
Pin 32 (X1402)	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 29 (X1402)	Signal	
Pin 45 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
B017 - Sensor, clutch pedal		
X166	Separation point on B017 sensor	
Pin 1	Earth	
Pin 2	+ supply (8.5 VDC)	Switch on ignition.
Pin 3	Signal	
X553 earth pin		

Measuring points and signal values

Measuring points on the B017 - Sensor, clutch pedal	
Pin	**Function**
1	Earth
2	+ supply
3	Signal

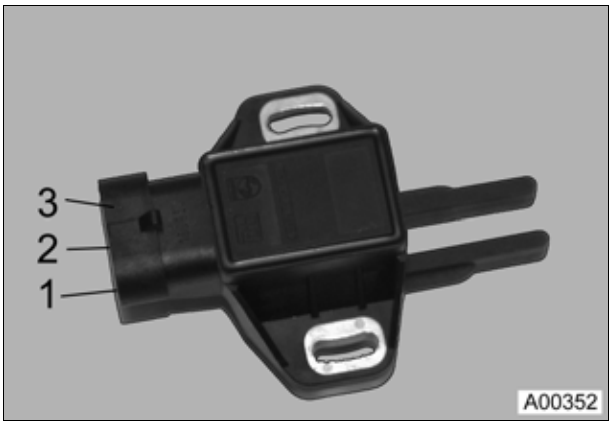


Fig. 195. I001451

NOTE: *Connect the X899.980.246.205 adapter cable directly to the **B017** - Sensor, clutch pedal.*
Ignition ON.
All readings +/- 10%

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	2	8.5 VDC		Microfuse (no. 5) in A013 or within wiring set
Earth	1			
Signal	3	1.0 VDC	Clutch not depressed	
		3.4 VDC	Clutch depressed	
Earth	1			

Measuring point on A050 - ECU, basic control unit (X1402 + X1403 separation points)	
Function	**Pin**
Signal	29 (X1402)
Sensor system earth	45 (X1403)

NOTE: *see §31*
see §34

Measuring power consumption
Draw out bridge at pin 29 (at X1402) on adapter box.
Measure pin 29 with multimeter (ammeter).
Clutch not depressed = 5 mADC
Clutch fully depressed = 17 mADC

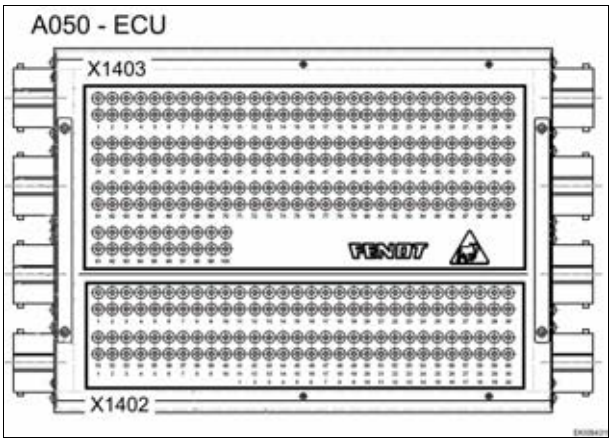


Fig. 196. I001874

Possible cause of fault

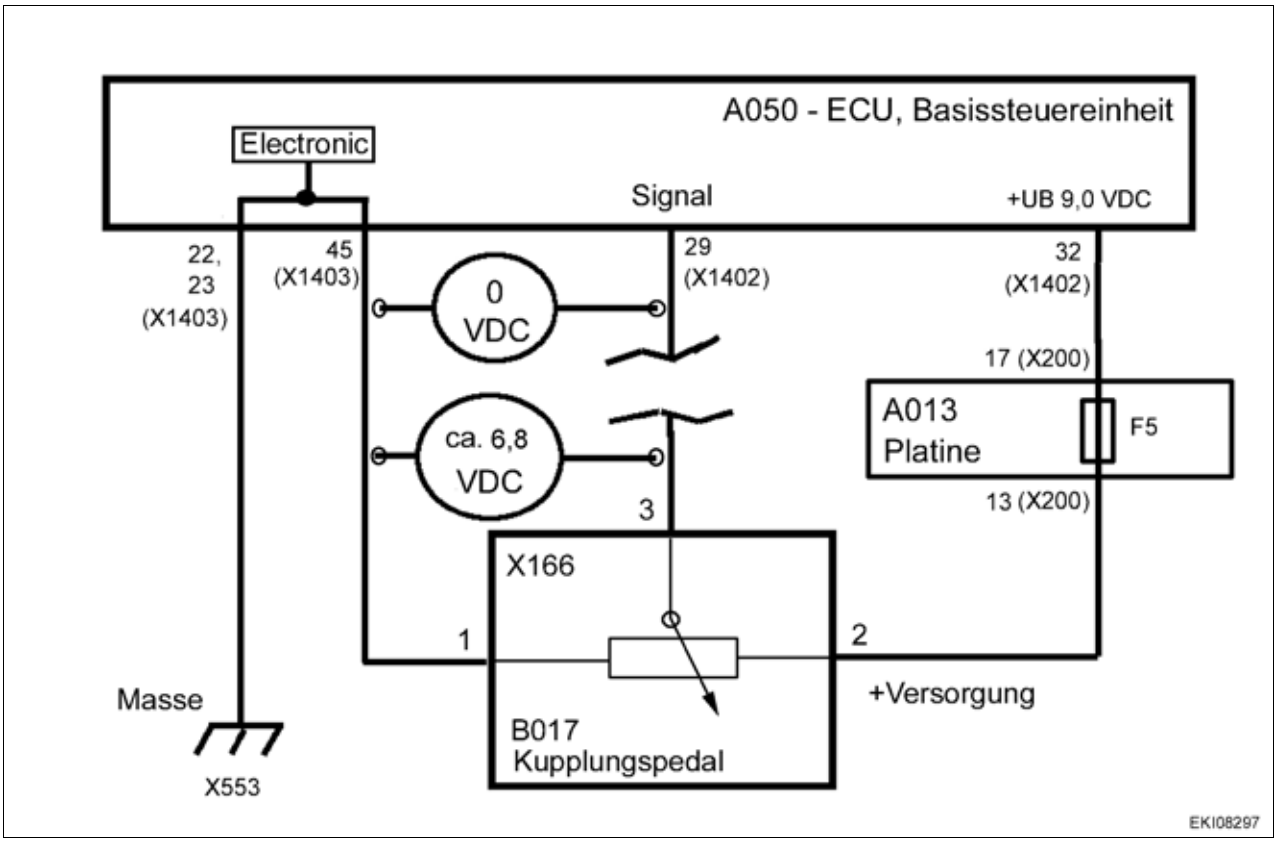


Fig. 197. I001944

NOTE: *The **B017** - Sensor, clutch pedal must be calibrated*
see §13

55 B019/B060 compressed air supply sensor

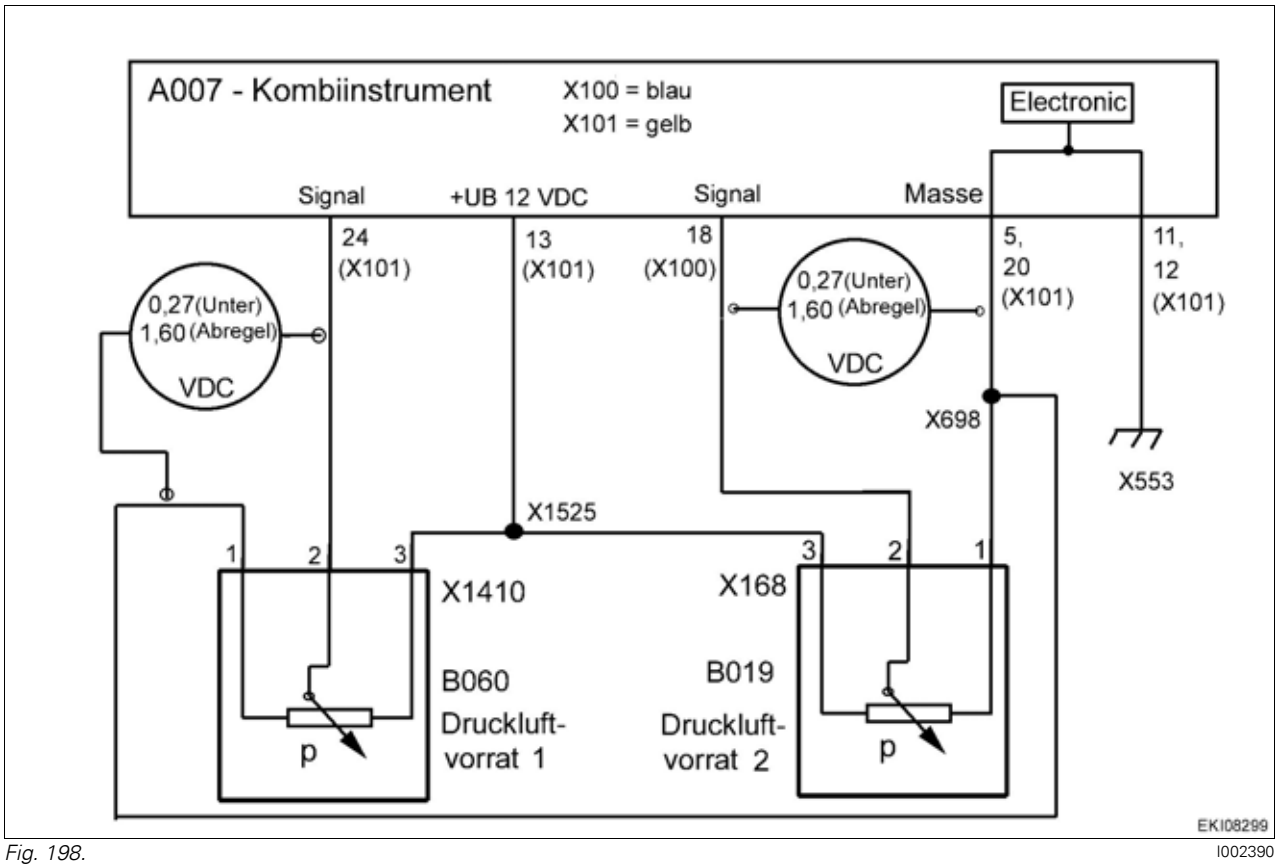


Fig. 198. I002390

Item	Designation	Note
A007 - Instrument panel		
X100	"Blue" separation point on **A007** - Instrument panel	
X101	"Yellow" separation point on **A007** - Instrument panel	
Pin 13 (X101 "yellow")	+ supply for B019/B060 sensor (12 VDC)	Switch on ignition.
Pin 18 (X100 "blue")	Signal from B019 sensor	In 2-circuit brake system only.
Pin 24 (X101 "yellow")	Signal from B060 sensor	
Pins 5 and 20 (X101 "yellow")	Sensor system earth	
Pins 11 and 12 (X101 "yellow")	Electronics earth	
B019 - Sensor, compressed air supply **(Fitted in 2-circuit brake system only)**		
X168	Separation point on B019 sensor	
Pin 1	Earth	
Pin 2	Signal	
Pin 3	+ supply (12 VDC)	Switch on ignition.
B060 - Compressed air supply sensor		
X1410	Separation point on B060 sensor	
Pin 1	Earth	
Pin 2	Signal	
Pin 3	+ supply (12 VDC)	Switch on ignition.

Item	Designation	Note
X553 earth pin		
X698 connector (sensor system earth)		
X1525 connector (+UB 12 VDC)		

Measuring points and signal values

Measuring points on B019/B060 compressed air supply sensor	
Pin	**Function**
1	Earth
2	Signal
3	+ supply

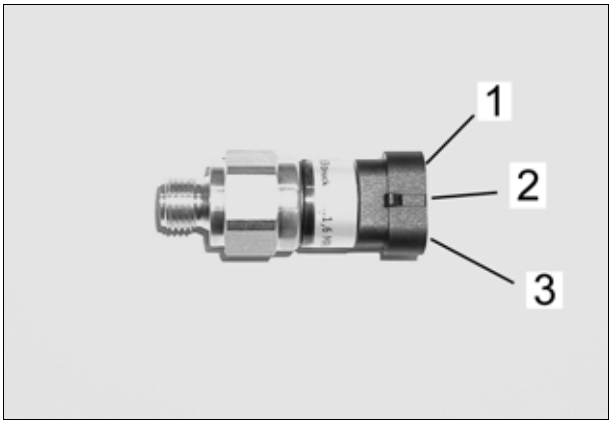


Fig. 199. I000647

NOTE: *Connect the X 899.980.246.205 adapter cable directly to the B019/B060 sensor.*

With 1-circuit brake system (rear wheel brake and 4WD engagement),
check reservoir pressure in circuit 1
Release pressure in compressed air provision system.
Connect testing manometer to **testing connection (C).**
Measure pin 1 (earth) and pin 2 (signal) on **B060** - Compressed air supply sensor.
Start engine.

NOTE: *The pressure controller must blow off at approx. 8.4 bar.*

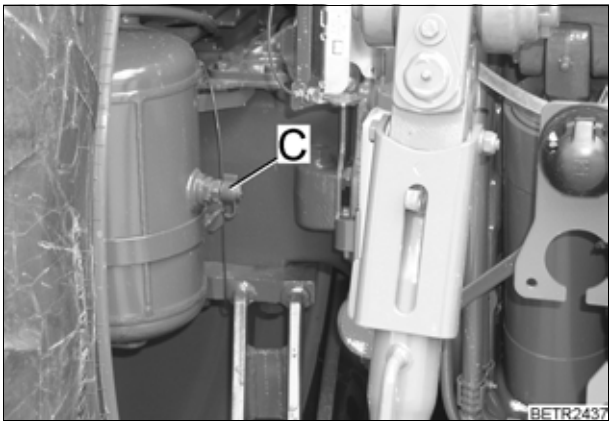


Fig. 200. I001460

With 2-circuit brake system (rear wheel brake and front wheel brake),
check reservoir pressure in circuit 1 (rear wheel brake) (pos.B)
Release pressure in compressed air provision system.
Connect testing manometer to **testing connection (B).**
Measure pin 1 (earth) and pin 2 (signal) on **B060** - Compressed air supply sensor.
Start engine.

Check reservoir pressure in circuit 2 (front wheel brake) (pos.D)
Release pressure in compressed air provision system.
Connect testing manometer to **testing connection (D).**
Measure pin 1 (earth) and pin 2 (signal) on **B019** - Sensor, compressed air supply.
Start engine.

NOTE: *The pressure controller must blow off at approx. 8.4 bar.*

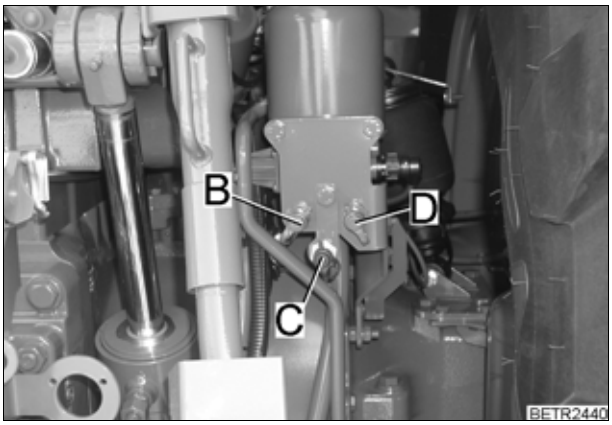


Fig. 201. I001461

Note: all measurement values are approx. values		
Voltage	**Pressure**	**Display on A007 instrument panel**
0.34 VDC	0 bar	1 bar flashing
0.40 VDC	1,5 bar	1 bar
0.51 VDC	2,1 bar	2 bars
0.65 VDC	2,9 bar	3 bars
0.80 VDC	3,7 bar	4 bars
0.94 VDC	4,5 bar	5 bars
1.09 VDC	5,4 bar	6 bars
1.24 VDC	6,2 bar	7 bars
1.37 VDC	6,9 bar	8 bars
1.57 VDC	8,4 bar	9 bars

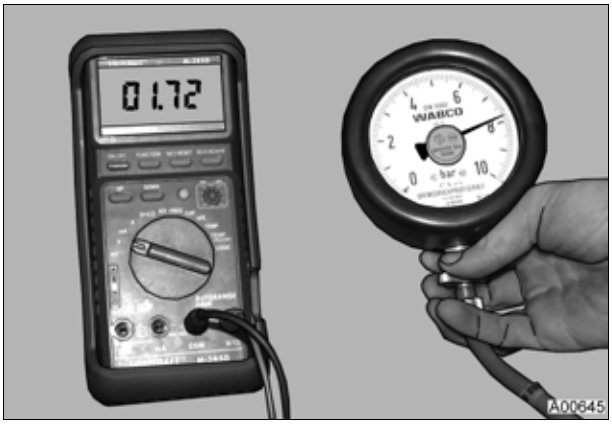


Fig. 202. I001457

Checking display (compressed air supply) in A007 instrument panel

Connect X899.980.208.100 e-adapter box to the A007 instrument panel using X899.980.208.204 adapter cable	
Pin at separation point	Pin on the adapter box (68-pin)
X101 separation point "yellow" (1 to 26)	1 to 26
X100 separation point "blue" (1 to 26)	31 to 56

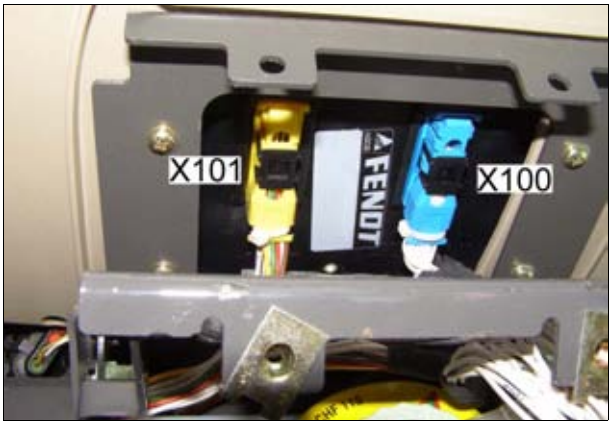


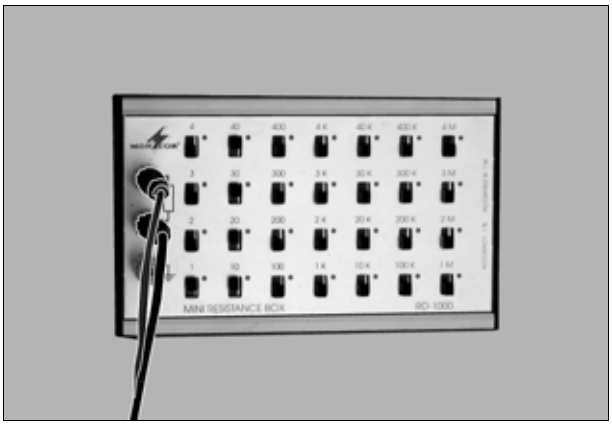
Fig. 203. I001226

NOTE: *see §1*

Check the compressed air supply display on A007 - Instrument panel

Connect X899.980.246.205 adapter cable directly to the component (B019 or B060).
The connection to the sensor remains open.
Connect the X 899.980.224 resistance decade.
and select corresponding resistance (see table below).
Switch on ignition.

NOTE: *Both sensors, **B019** - Sensor, compressed air supply and **B060** - Compressed air supply sensor are monitored by **A007** - Instrument panel. The lower pressure is always displayed.*


Fig. 204. I000650

Check the warning message for compressed air supply on A007 - Instrument panel
Connect X899.980.246.205 adapter cable directly to the component (B019 or B060).
The connection to the sensor remains open.
Connect the X 899.980.224 resistance decade.
and select corresponding resistance (see table below).
Switch on ignition.

NOTE: *Both sensors, **B019** - Sensor, compressed air supply and **B060** - Compressed air supply sensor are monitored by **A007** - Instrument panel. If one of the pressures falls below the warning limit, an error message will appear with the corresponding error code.*

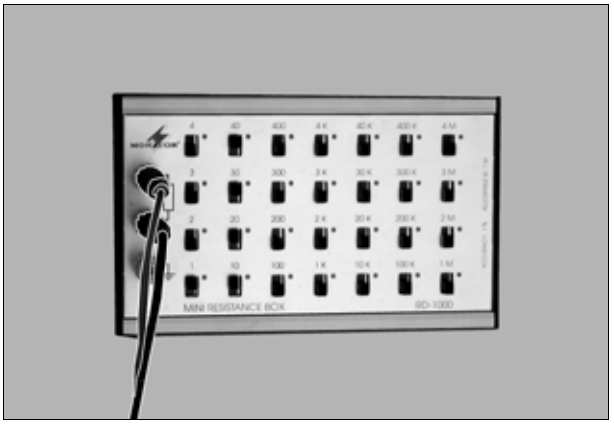


Fig. 205. I000650

The compressed air supply is displayed on **A007** - Instrument panel (A)
If the pressure in the reservoir is too low, a warning message is displayed.

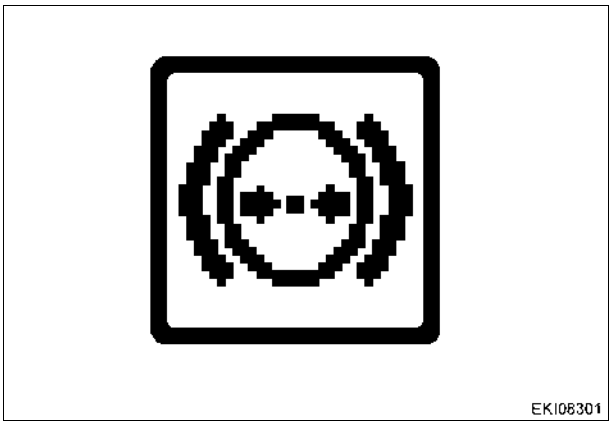


Fig. 206. I001467

Note: all measurement values are approx. values		
Resistance	**Voltage**	**Display on A007 instrument panel**
20 ohms	0.34 VDC	1 bar flashing
25 ohms	0.40 VDC	1 bar
32 ohms	0.51 VDC	2 bars
41 ohms	0.65 VDC	3 bars
50 ohms	0.80 VDC	4 bars
59 ohms	0.94 VDC	5 bars
68 ohms	1.09 VDC	6 bars
77 ohms	1.24 VDC	7 bars
86 ohms	1.37 VDC	8 bars
96 ohms	1.57 VDC	9 bars

Further checks on compressed air system
NOTE: *see §1*
see §2
see §3

Leak-testing the compressed air system
The display on the A007 instrument panel must remain unchanged for at least **3 minutes** with the engine stopped and the reservoir full.

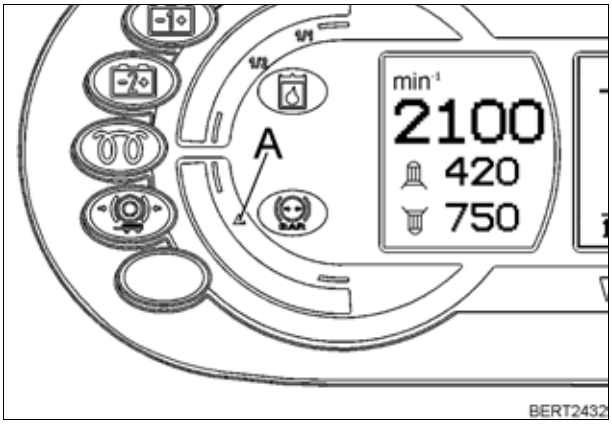


Fig. 207. I001454

NOTE: *Try not to move the cab (avoid climbing in and out) in such an event, as the pneumatic cab suspension will attempt to adjust accordingly and thus use air.*

56 B020 sensor, rear PTO speed (stub shaft)

NOTE: *The **B020** - Sensor, rear PTO speed (stub shaft) and the **B021** - Sensor, rear PTO speed (clutch) monitor each other.*
The rotation ratio between the clutch (B020) and the stub shaft (B021) depends on the selected PTO level.
The PTO levels are programmed in the end-of-line program (EOL).

– *PTO step: 540E / 1000 rpm (standard)*
– *PTO step: 540 / 1000 rpm (optional)*

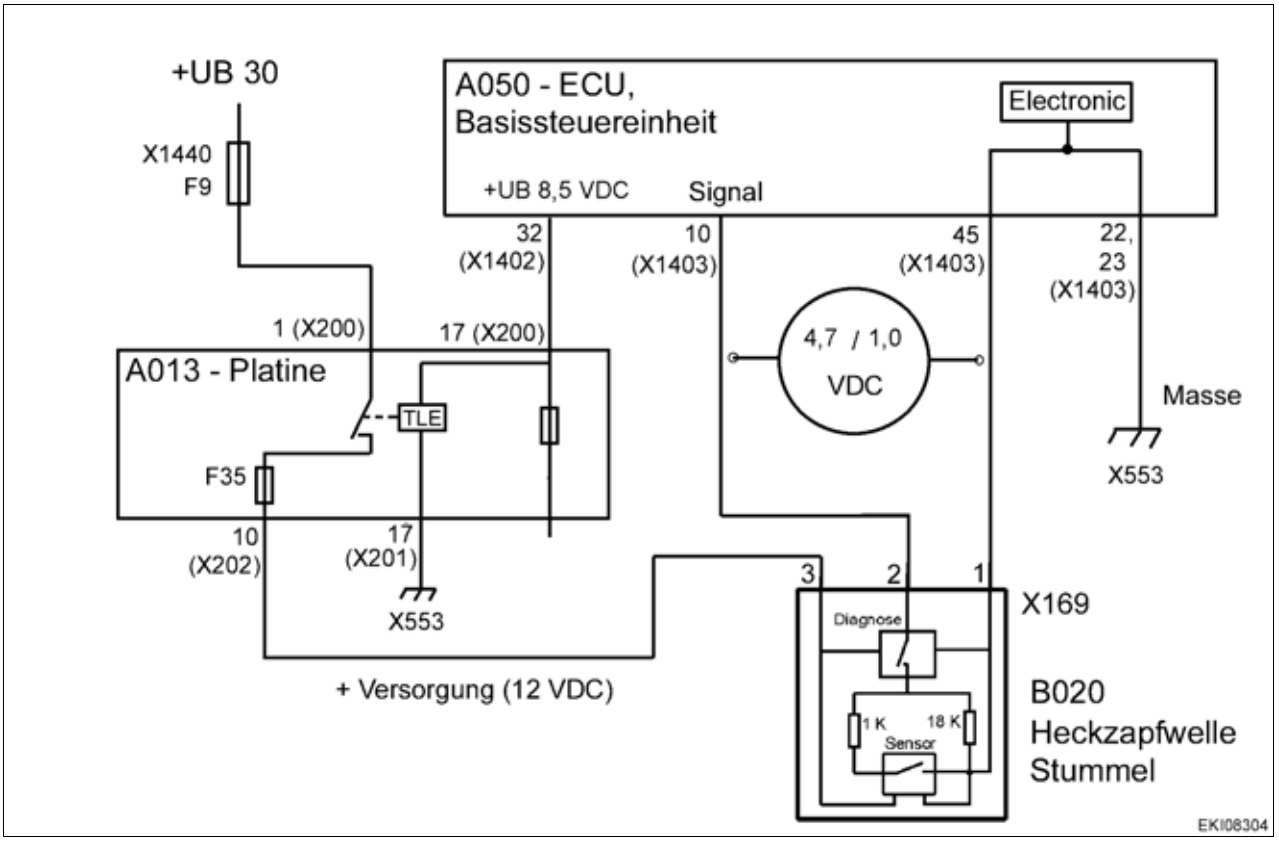


Fig. 208. I001945

Item	Designation	Note
A013 - PCB, microfuses **(microfuse no. 35)**		
X200	Separation point on A013 PCB_microfuse	
X201	Separation point on A013 PCB_microfuse	
X202	Separation point on A013 PCB_microfuse	
Pin 1 (X200)	+ supply for the A013 PCB_microfuse (12 VDC)	
Pin 17 (X200)	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 17 (X201)	Earth	
Pin 10 (X202)	+ supply for B020 sensor	Switch on ignition.
A050 - ECU, basic control unit		
X1402	Separation point on the A050 ECU, basic control unit	
X1403	Separation point on the A050 ECU, basic control unit	
Pin 32 (X1402)	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 10 (X1403)	Signal	When stationary, depending on ratchet wheel position
Pin 45 (X1403)	Sensor system earth	

Item	Designation	Note
Pins 22 and 23 (X1403)	Electronics earth	
B020 - Sensor, rear PTO speed (stub shaft)		
X169	Separation point on B020 sensor	
Pin 1	Earth	
Pin 2	Signal	When stationary, depending on ratchet wheel position
Pin 3	+ supply (12 VDC)	Switch on ignition.

Measuring points and signal values

Measuring points on B020 sensor, rear PTO speed (stub shaft)	
Pin	**Function**
1	Earth
2	Signal
3	+ supply



Fig. 209. I000616

NOTE: *Connect the X899.980.246.205 adapter cable directly to the **B020** - Sensor, rear PTO speed (stub shaft).*
Ignition ON.
All readings +/- 10%

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	3	12 VDC to 14 VDC		Microfuse (no. 35) in A013 or in wiring set
Earth	1			
Speed signal	2	4.7/1.0 VDC	Rear PTO stationary (depending on ratchet wheel position)	**A.) Reading: 6.3 VDC** – Fault in component **B.) Reading: 0 VDC** Unplug component and measure at plug If reading is 0 VDC - Fault in A050 (pin 10 at X1403 separation point) - or fault within wiring set If reading is 6.3 VDC – Fault in component
		approx. 1.3 VDC	Rear PTO rotates	
Earth	1			

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Signal	10
Sensor system earth	45

NOTE: *see §28*
see §34

Possible cause of fault

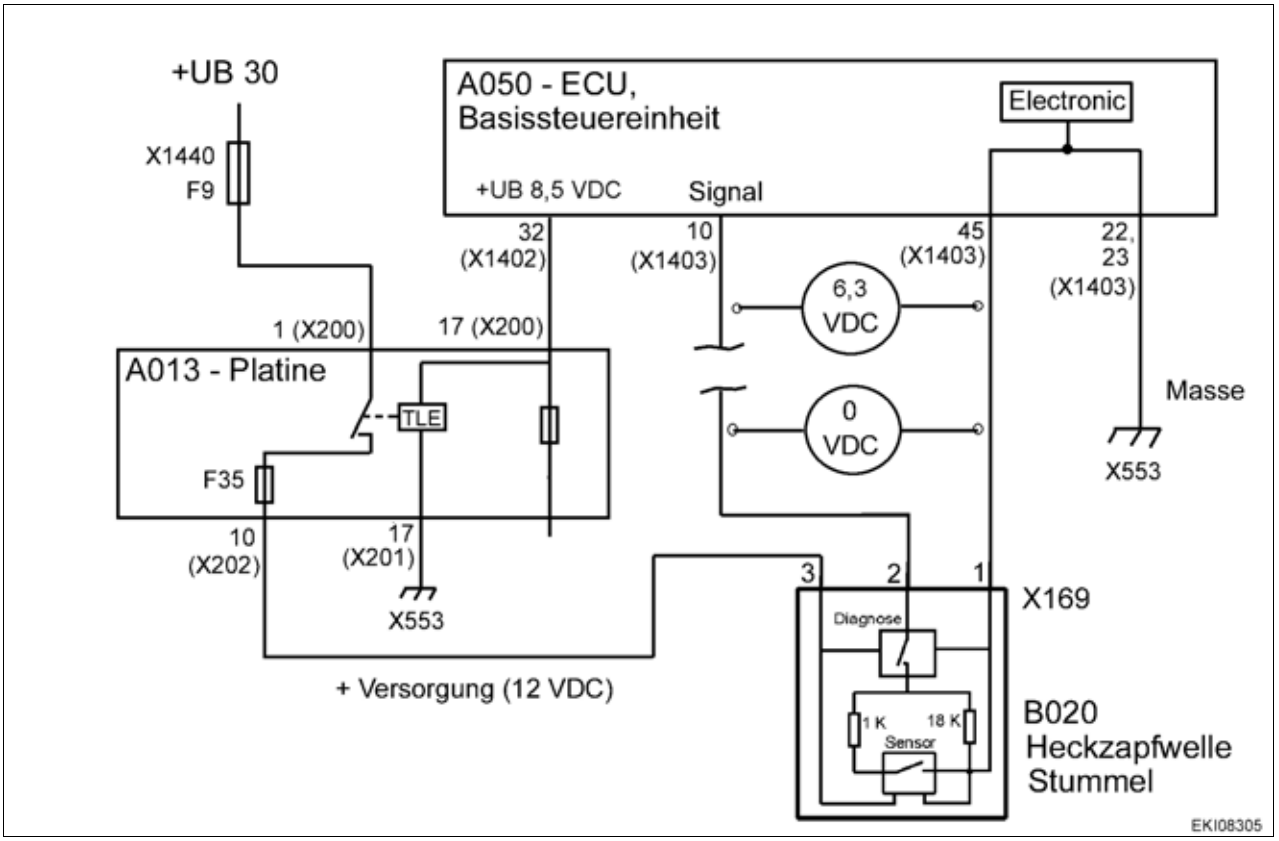


Fig. 210. I001946

.

NOTE: *see §1*

57 B021 sensor, rear PTO speed (clutch)

NOTE: *The **B020** - Sensor, rear PTO speed (stub shaft) and the **B021** - Sensor, rear PTO speed (clutch) monitor each other.*
The rotation ratio between the clutch (B020) and the stub shaft (B021) depends on the selected PTO level.
The PTO levels are programmed in the end-of-line program (EOL).

– *PTO step: 540E / 1000 rpm (standard)*
– *PTO step: 540 / 1000 rpm (optional)*

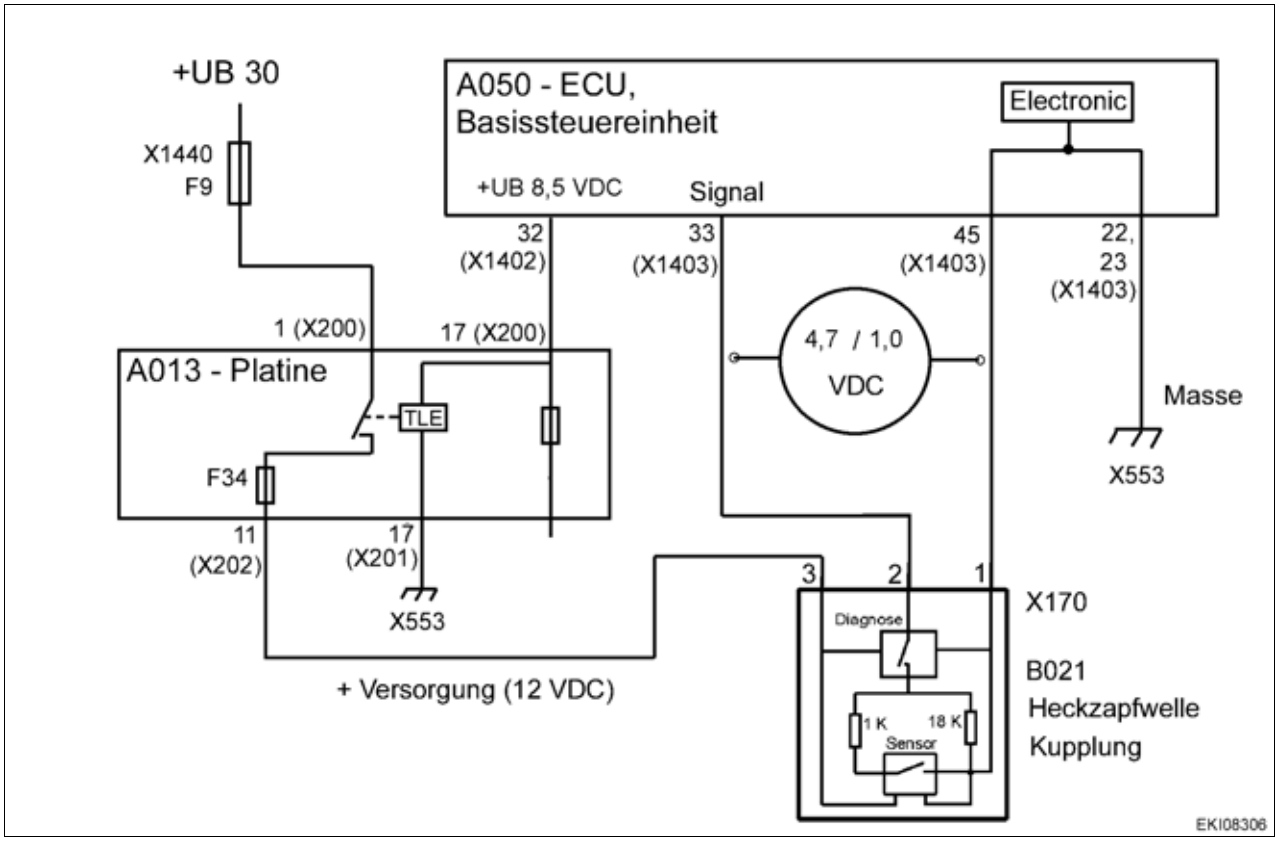


Fig. 211. I001947

Item	Designation	Note
A013 - PCB, microfuses **(microfuse no. 35)**		
X200	Separation point on A013 PCB_microfuse	
X201	Separation point on A013 PCB_microfuse	
X202	Separation point on A013 PCB_microfuse	
Pin 1 (X200)	+ supply for the A013 PCB_microfuse (12 VDC)	
Pin 17 (X200)	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 17 (X201)	Earth	
Pin 11 (X202)	+ supply for B021 sensor	Switch on ignition.
A050 - ECU, basic control unit		
X1402	Separation point on the A050 ECU, basic control unit	
X1403	Separation point on the A050 ECU, basic control unit	
Pin 32 (X1402)	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 33 (X1403)	Signal	When stationary, depending on ratchet wheel position
Pin 45 (X1403)	Sensor system earth	

Item	Designation	Note
Pins 22 and 23 (X1403)	Electronics earth	
B021 - Sensor, rear PTO speed (clutch)		
X170	Separation point on B021 sensor	
Pin 1	Earth	
Pin 2	Signal	When stationary, depending on ratchet wheel position
Pin 3	+ supply (12 VDC)	Switch on ignition.

Measuring points and signal values

Measuring points on B021 rear PTO speed sensor (clutch)	
Pin	**Function**
1	Earth
2	Signal
3	+ supply



Fig. 212. I000616

NOTE: *Connect the X899.980.246.205 adapter cable directly to the **B021** - Sensor, rear PTO speed (clutch).*
Ignition ON.
All readings +/- 10%

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	3	12 VDC to 14 VDC		Microfuse (no. 34) in A013 or in wiring set
Earth	1			
Speed signal	2	4.7/1.0 VDC	Rear PTO stationary (depending on ratchet wheel position)	**A.) Reading: 6.3 VDC** – Fault in component **B.) Reading: 0 VDC** Unplug component and measure at plug If reading is 0 VDC - Fault in A050 (pin 33 at X1403 separation point) - or fault within wiring set If reading is 6.3 VDC – Fault in component
		approx. 1.8 VDC	Rear PTO rotates	
Earth	1			

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Signal	33
Sensor system earth	45

NOTE: *see §28*
see §34

Possible cause of fault

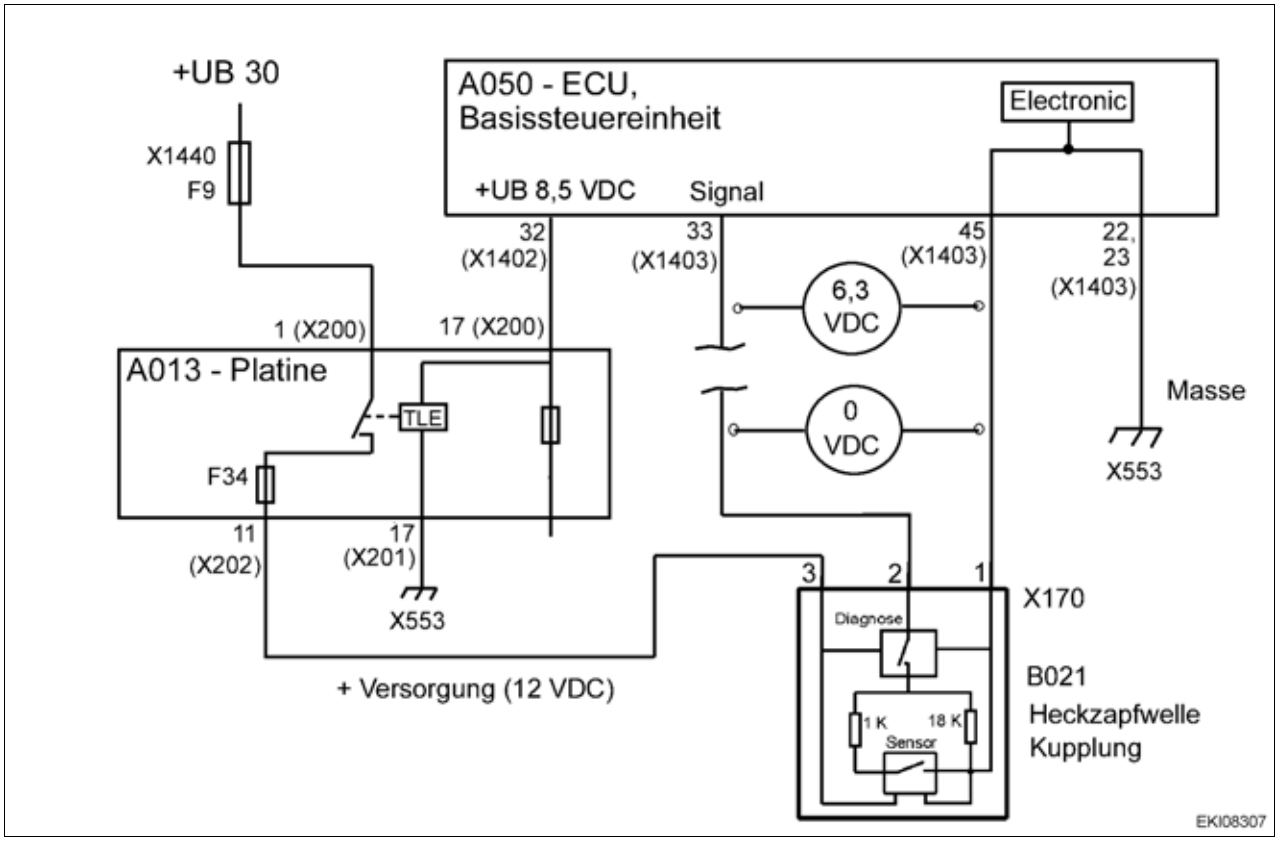


Fig. 213. I001948

.

NOTE: *see §1*

58 B030 sensor, rear power lift position

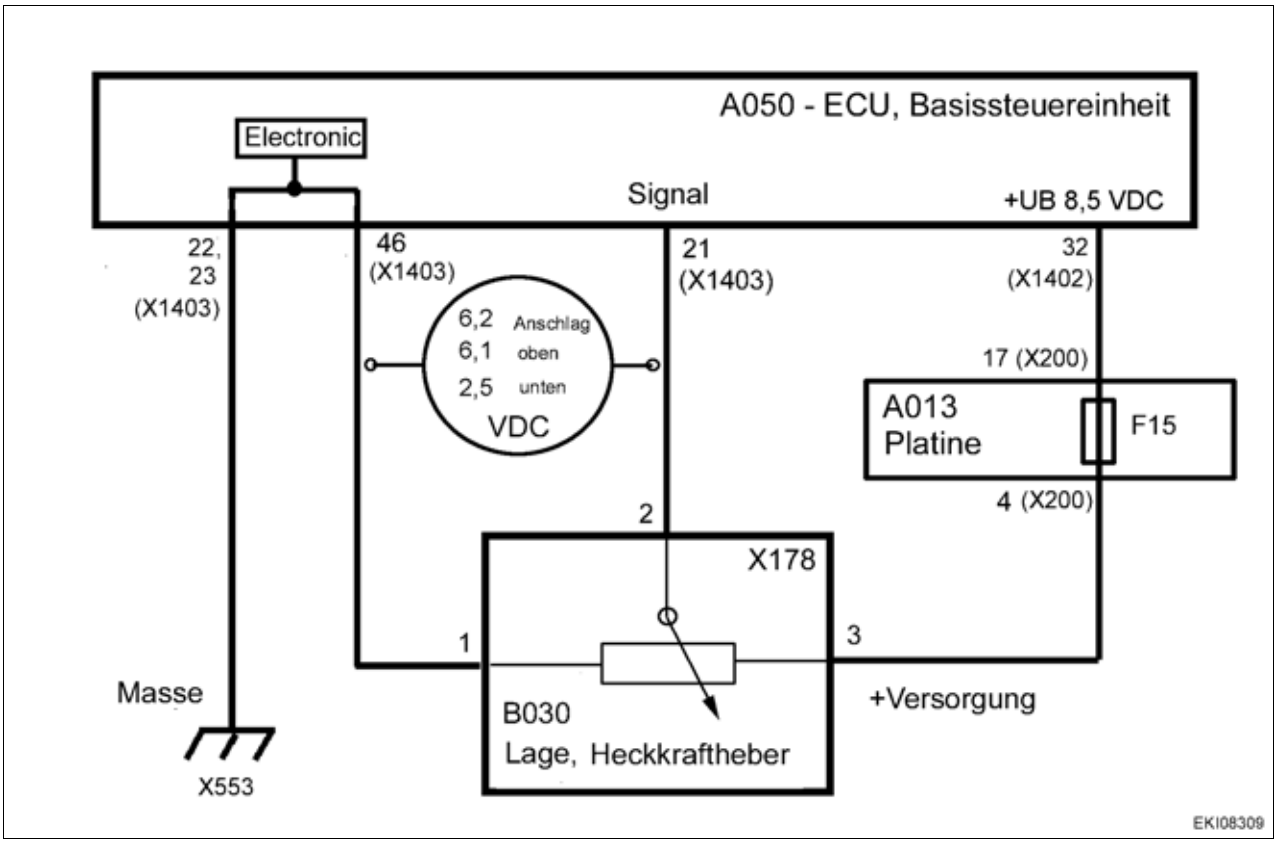


Fig. 214. I001949

Item	Designation	Note
A013 - PCB, microfuses **(microfuse no. 15)**		
X200	Separation point on A013 PCB_microfuse	
Pin 17	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 4	+ supply for the B030 sensor (8.5 VDC)	Switch on ignition.
A050 - ECU, basic control unit		
X1402	Separation point on the A050 ECU, basic control unit	
X1403	Separation point on the A050 ECU, basic control unit	
Pin 32 (X1402)	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 21 (X1403)	Signal	
Pin 46 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
B030 - Sensor, rear power lift position		
X178	Separation point on B030 sensor	
Pin 1	+ supply (8.5 VDC)	Switch on ignition.
Pin 2	Signal	
Pin 3	Earth	
X553 earth pin		

Measuring points and signal values

Measuring points on B030 rear power lift position sensor	
Pin	**Function**
1	Earth
2	Signal
3	+ supply

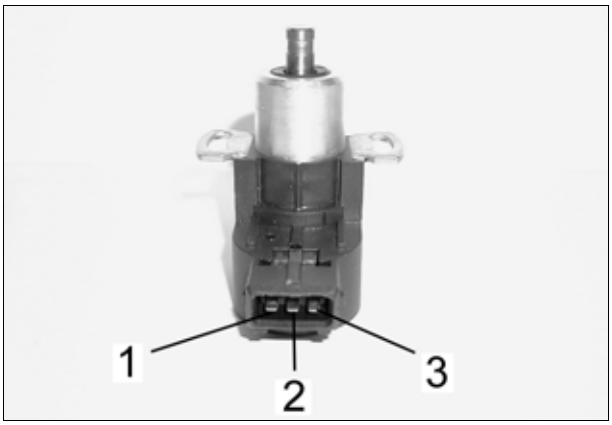


Fig. 215. I000654

NOTE: *Connect the X899.980.246.202 adapter cable directly to the **B030** - Sensor, rear power lift position.*
Ignition ON.
All readings +/- 10%

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	3	8.5 VDC		Microfuse (no. 15) in A013 or within wiring set
Earth	1			
Signal	2	2.5 VDC	Lifting gear lowered	
		6.1 VDC	Lifting gear raised	
		6.2 VDC	Mech. stop **Note:** Using S027/S029 external raise switch, move rear power lift against the mechanical stop (overrun approx. 15mm)	
Earth	1			

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Signal	21
Earth	46

NOTE: *see §22*
see §34

Possible cause of fault

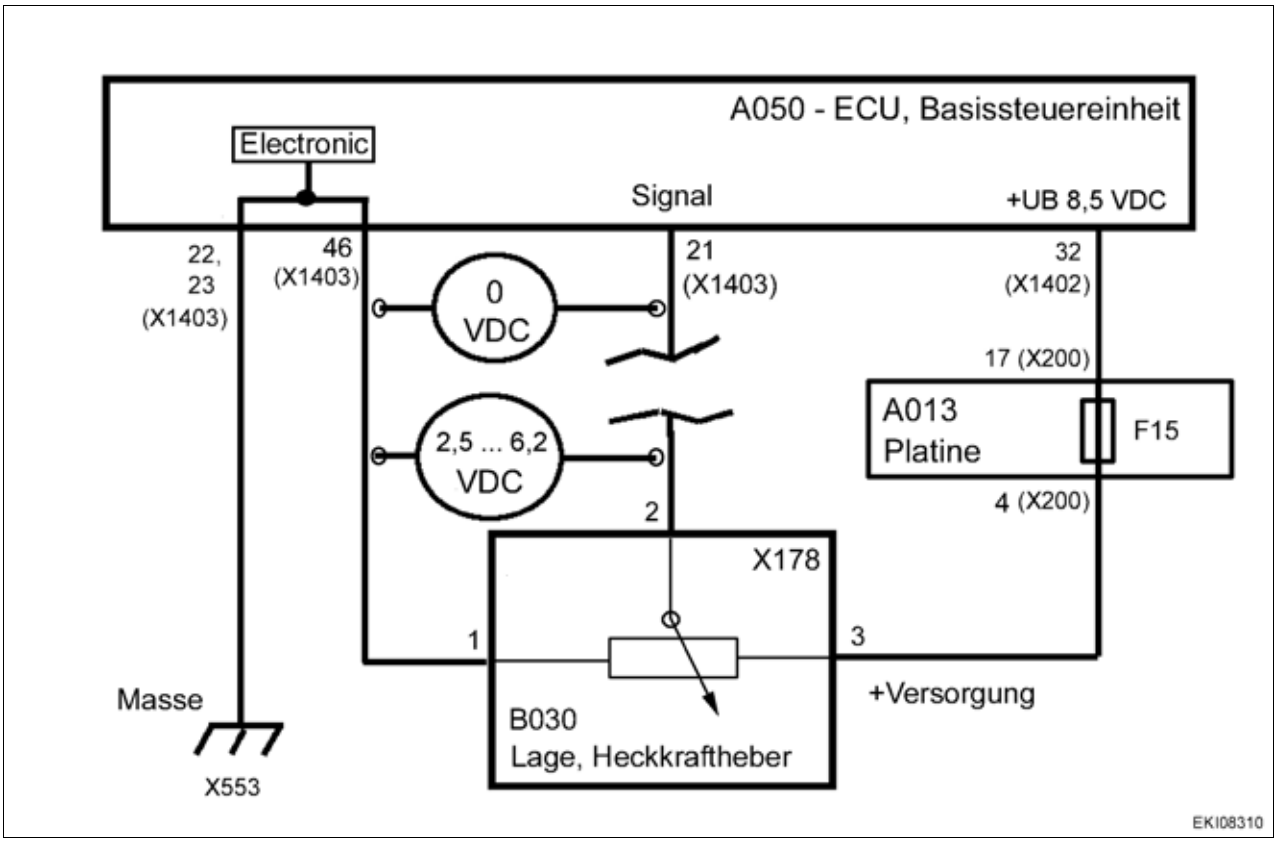


Fig. 216. I001950

NOTE: *see §2*
see §7

59 B031/B032 right/left draught sensing pin

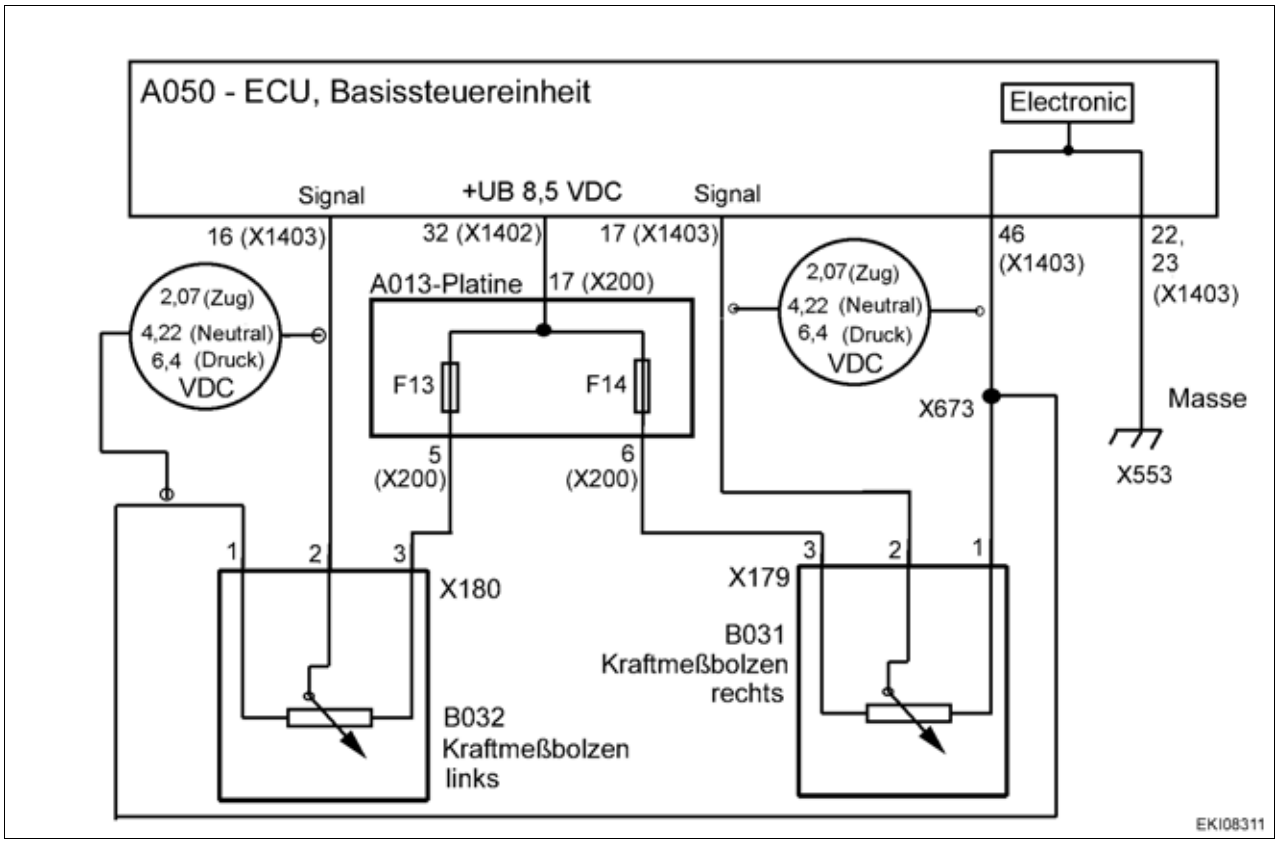


Fig. 217. I001951

Item	Designation	Note
A013 - PCB, microfuses **(microfuse no. 13 = B032 left draught sensing pin)** **(microfuse no. 14 = B031 right draught sensing pin)**		
X200	Separation point on A013 PCB_microfuse	
Pin 17	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 6	+ supply for B031 draught sensing pin (8.5 VDC)	Switch on ignition.
Pin 5	+ supply for B032 draught sensing pin (8.5 VDC)	Switch on ignition.
A050 - ECU, basic control unit		
X1402	Separation point on the A050 ECU, basic control unit	
X1403	Separation point on the A050 ECU, basic control unit	
Pin 32 (X1402)	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 17 (X1403)	B031 signal	
Pin 16 (X1403)	B032 signal	
Pin 46 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
B031 - Sensor, draft sensing pin, right		
X179	Separation point on B031 draught sensing pin	
Pin 1	Earth	
Pin 2	Signal	
Pin 3	+ supply (8.5 VDC)	Switch on ignition.

Item	Designation	Note
B032 - Sensor, draft sensing pin, left		
X180	Separation point on B032 draught sensing pin	
Pin 1	Earth	
Pin 2	Signal	
Pin 3	+ supply (8.5 VDC)	Switch on ignition.
X553 earth pin		

NOTE: *see §2*

Measuring points and signal values

Measuring points on B031/B032 right/left draught sensing pin	
Pin	**Function**
1	Earth
2	Signal
3	+ supply

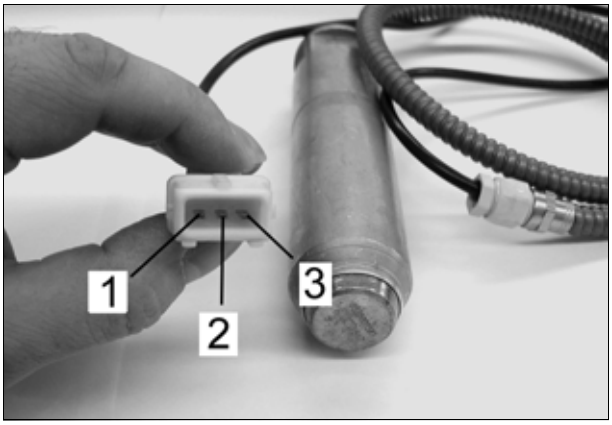


Fig. 218. I000661

NOTE: *Connect the X899.980.246.202 adapter cable directly to the **B031** - Sensor, draft sensing pin, right, **B032** - Sensor, draft sensing pin, left.*
Ignition ON.
All readings +/- 10%

To test the signal voltage:
Press back lower link with a fitting lever.

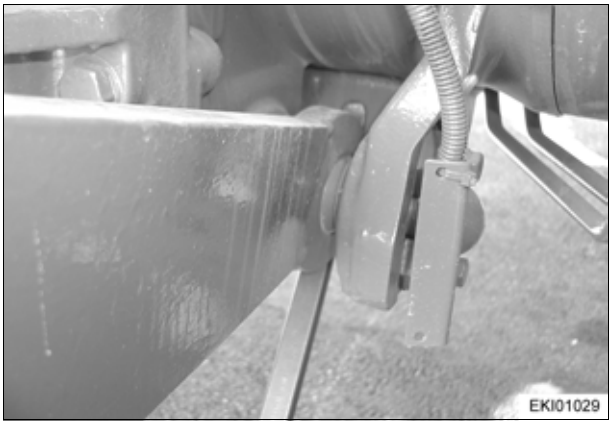


Fig. 219. I001504

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	3	8.5 VDC		On A013 - Microfuse no. 14 (B031 right draught sensing pin) - Microfuse no. 13 (B032 left draught sensing pin) or within wiring set
Earth	1			

Test	Pin	Specified value	condition	Possible cause of fault
Signal	2	2.07 VDC	Tractive force	**Overload threshold:** Voltage below 2.07 VDC = F.C. 08.1.33 / 08.1.34. Voltage below 6.40 VDC = F.C. 08.1.33 / 08.1.34. **Error threshold:** 0 VDC or short-circuit to earth = F.C. 08.1.31 / 08.1.32. Overload threshold or short-circuit to + = F.C. 08.1.33 / 08.1.34.
		4.22 VDC +/- 10%	Neutral	
		6.40 VDC	Pressure force	
Earth	1			

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
B031 - Sensor, draft sensing pin, right signal	17
B032 - Sensor, draft sensing pin, left signal	16
+ supply	32
Earth	46

NOTE: *see §22*
see §34

60 B034 immersed tube sensor (fuel)

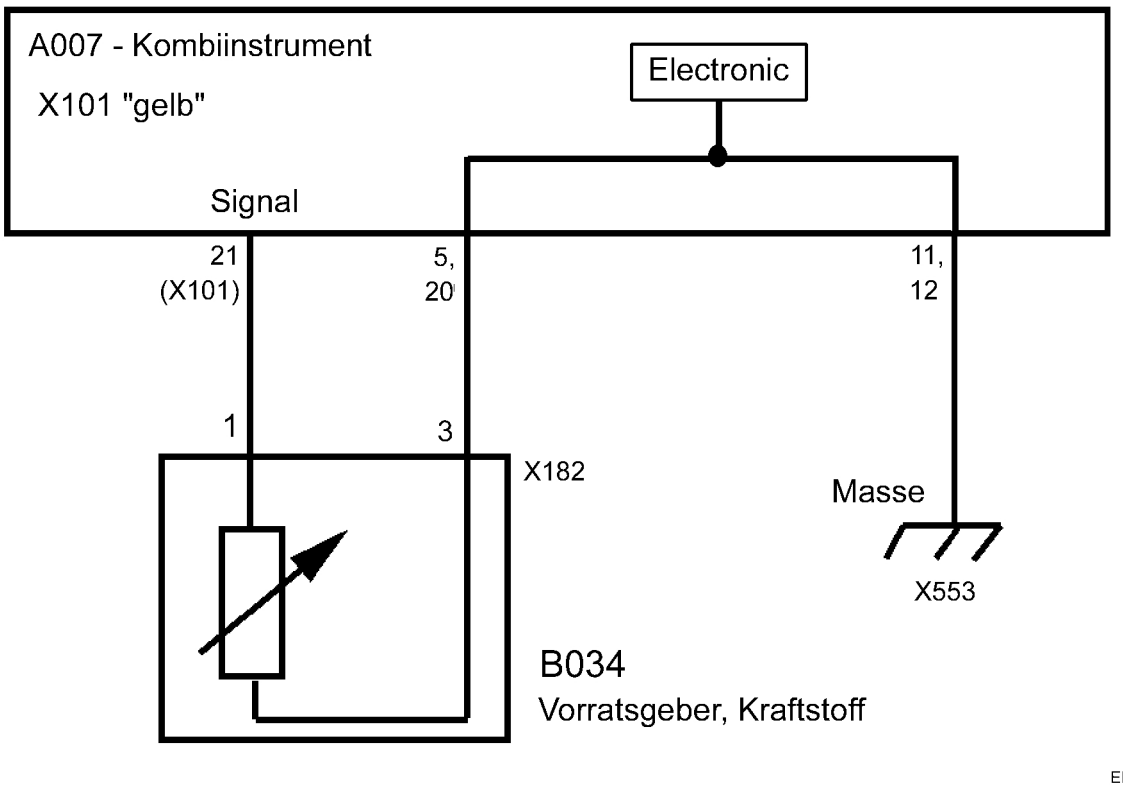


Fig. 220. I002388

Item	Designation	Note
A007 - Instrument panel		
X101	"Yellow" separation point on A007 instrument panel	
Pins 5 and 20 (X101 "yellow")	Sensor system earth	
Pins 11 and 12 (X101 "yellow")	Electronics earth	
Pin 21 (X101 "yellow")	Signal	
B034 - Immersed tube sensor (fuel)		
X182	Separation point on B034 fuel level sensor	
Pin 1	Signal	
Pin 3	Earth	
X553 earth pin		

Measuring points and signal values

Measuring points on the B034 - Immersed tube sensor (fuel)	
Pin	**Function**
1	Signal
2	Not assigned
3	Earth

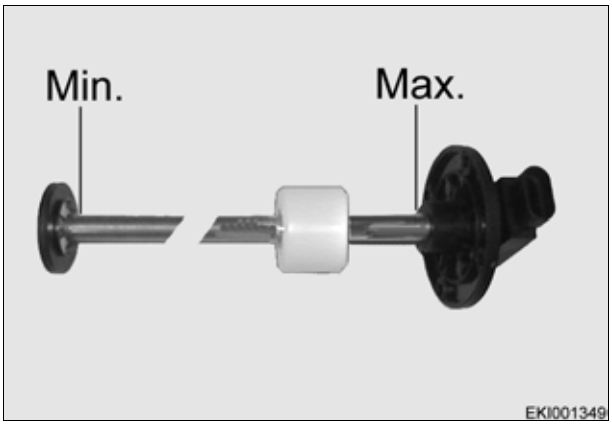


Fig. 221. I001509

Test B034 fuel level sensor
Remove B034 fuel level sensor.
Connect the X899.980.246.205 adapter cable to B034 fuel level sensor.
Move float (arrow) by hand.

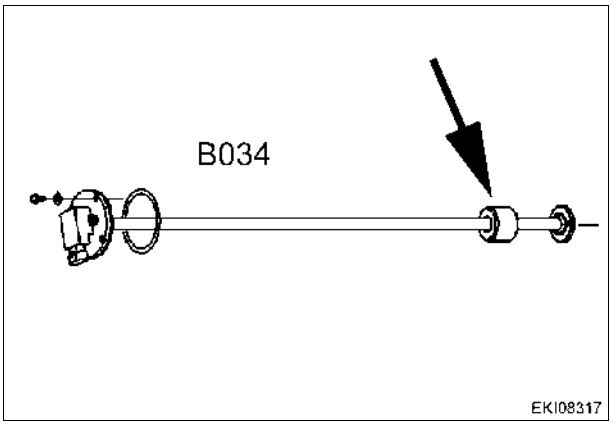


Fig. 222. I001510

Using the X899.980.208.204 adapter cable, connect the X899.980.208.100 e-adapter box to the A007 - Instrument panel	
Pin at separation point	Pin on the adapter box (68-pin)
X101 separation point "yellow" (1 to 26)	1 to 26
X100 separation point "blue" (1 to 26)	31 to 56

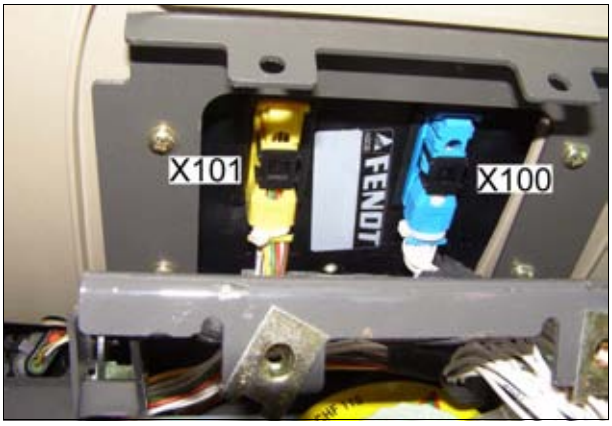


Fig. 223. I001226

NOTE: *see §1*

Check fuel gauge display on A007 - Instrument panel
Connect the X899.980.246.205 adapter cable to X182 separation point (connection to B034 remains open).
Connect the X 899.980.224 resistance decade.
Switch on ignition.
Select corresponding resistance (see table) and compare with display on the **A007** - Instrument panel.

NOTE: *Allow preconditioning time of approx. 1 minute.*

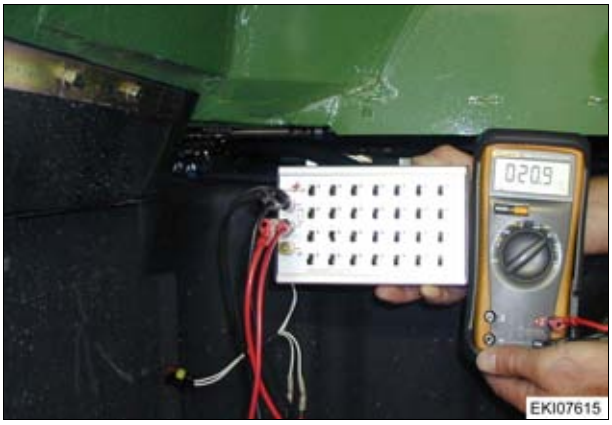


Fig. 224. I001514

B034 fuel level sensor (Note: all values are approx. values)			
Display on A007 instrument panel	**Signal**	**Resistance on B034 fuel level sensor**	**Litres**
1 bar flashing "EMPTY"	0.2 VDC	20 ohms	0 l
1 bar	0.6 VDC	60 ohms	30 l
2 bars	0.95 VDC	100 ohms	62 l
3 bars	1.35 VDC	140 ohms	96 l
4 bars	1.70 VDC	180 ohms	150 l
5 bars	2.10 VDC	220 ohms	173 l
6 bars	2.45 VDC	260 ohms	220 l
7 bars	2.80 VDC	300 ohms	280 l
8 bars	3.20 VDC	340 ohms	332 l
9 bars	3.60 VDC	380 ohms	410 l
10 bars	4.00 VDC	420 ohms	495 l
11 bars	4.34 VDC	460 ohms	575 l
12 bars	4.70 VDC	500 ohms	650 l
12 bars "FULL"	5.00 VDC	500 ohms	672 l

61 B039 sensor, high pressure 2

Measuring and testing

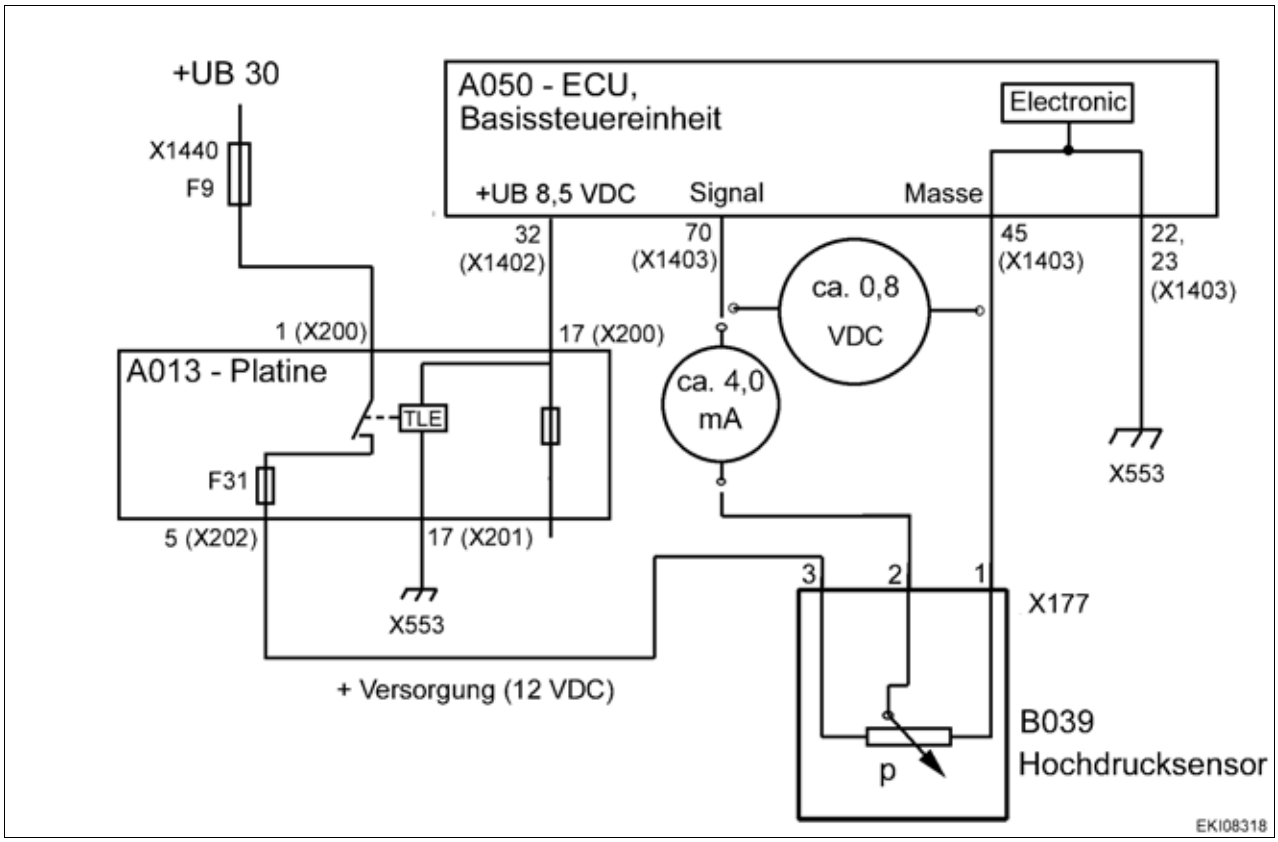


Fig. 225. I001954

Item	Designation	Note
A013 - PCB, microfuses **(microfuse no. 31)**		
X200	Separation point on **A013** - PCB, micro-fuses	
X201	Separation point on **A013** - PCB, micro-fuses	
X202	Separation point on **A013** - PCB, micro-fuses	
Pin 1 (X200)	+supply for the **A013** - PCB, microfuses (12 VDC)	
Pin 17 (X200)	+ supply for the **A013** - PCB, micro-fuses (8.5 VDC)	Switch on ignition.
Pin 17 (X201)	Earth	
Pin 5 (X202)	+supply for the **B039** - Sensor, high-pressure 2 (12 VDC)	Switch on ignition.
A050 - ECU, basic control unit		
X1402	Separation point on **A050** - ECU, basic control unit	
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 32 (X1402)	+ supply for the **A013** - PCB, micro-fuses (8.5 VDC)	Switch on ignition.
Pin 70 (X1403)	Signal	

Item	Designation	Note
Pin 45 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
B039 - Sensor, high-pressure 2		
X177	Separation point on **B039** - Sensor, high-pressure 2	
Pin 1	Earth	
Pin 2	Signal	Depending on transmission high pressure
Pin 3	+ supply (12 VDC)	Switch on ignition.
X553 - Earth pin, operator platform		
X1440 - Fuse holder		

Measuring points and signal values

Measuring points on the B008 - Sensor, high-pressure 1	
Pin	**Function**
1	Earth
2	Signal
3	+ supply

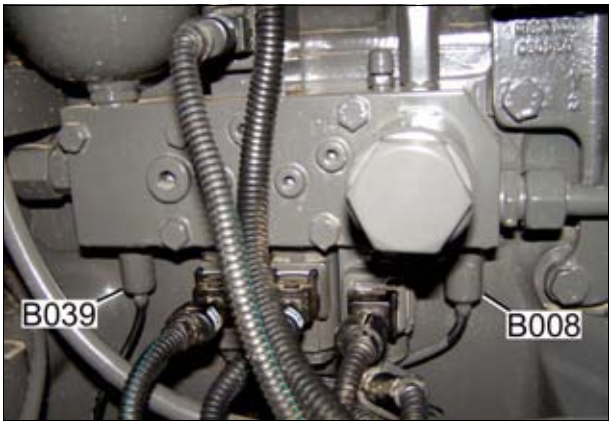


Fig. 226. I001057

NOTE: *Connect the X899.980.246.205 adapter cable directly to the **B008** - Sensor, high-pressure 1.*
Ignition ON.
All readings +/- 10%

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	3	12 VDC to 14 VDC		Microfuse (no. 31) in A013 or in wiring set
Earth	1			
Signal	2	approx. 0.8 VDC	0 bar (transmission in neutral)	
Earth	1			

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Signal	70
Sensor system earth	45

NOTE: *Draw out bridge at pin 70 (X1403) on X899.980.304.000 adapter box. Measure pin 70 with an ammeter. Switch on ignition.*
see §31
see §34

WARNING: The following test requires the tractor to be jacked up on all four wheels. (Risk of accident)

– Leave engine running.
– Engage travel range II.
– Actuate hand and foot brake.
– Engine speed: 1600 rpm.
– Select a forward or reverse ratio.

CAUTION: Perform high-pressure test for max. 5 seconds (oil heating).

B008 high pressure sensor (approx. values)		
Pressure in transmission (engine speed above 1400 rpm)	**Signal voltage**	**Current draw**
0 bar (Transmission in neutral)	0.80 VDC	4.0 mADC
30 bar (Transmission in ACTIVE STATIONARY)	0.94 VDC	4.7 mADC
100 bar	1.37 VDC	6.7 mADC
200 bar	1.90 VDC	9.2 mADC
300 bar	2.50 VDC	12.0 mADC
400 bar	3.00 VDC	14.8 mADC
560 bar (Switch-off pressure)	3.80 VDC	18.7 mADC

Transmission high-pressure test on Vario terminal
NOTE: *see §10*

Transmission high-pressure test using a manometer (min. 600 bar) (more precise)
NOTE: *see §3*

62 B040 front power lift position sensor (for front power lift enhanced control only)

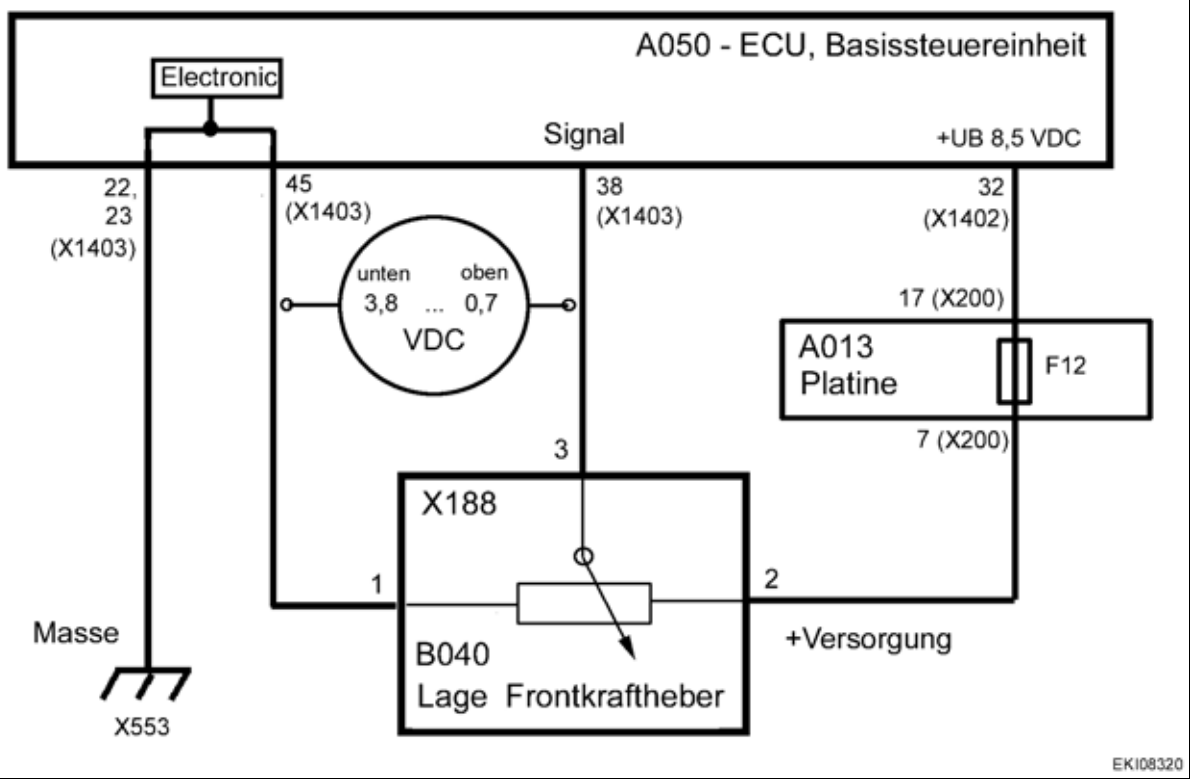


Fig. 227. I001952

Item	Designation	Note
A013 - PCB, microfuses **(microfuse no. 12)**		
X200	Separation point on A013 PCB_microfuse	
Pin 17	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 7	+ supply for the B040 sensor (8.5 VDC)	Switch on ignition.
A050 - ECU, basic control unit		
X1402	Separation point on the A050 ECU, basic control unit	
X1403	Separation point on the A050 ECU, basic control unit	
Pin 32 (X1402)	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 38 (X1403)	Signal	
Pin 45 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
B040 - Sensor, front power lift position		
X188	Separation point on B040 sensor	
Pin 1	Earth	
Pin 2	+ supply (8.5 VDC)	Switch on ignition.
Pin 3	Signal	
X553 earth pin		

Measuring points and signal values

Measuring points on the B040 - Sensor, front power lift position	
Pin	**Function**
1	Earth
2	+ supply
3	Signal

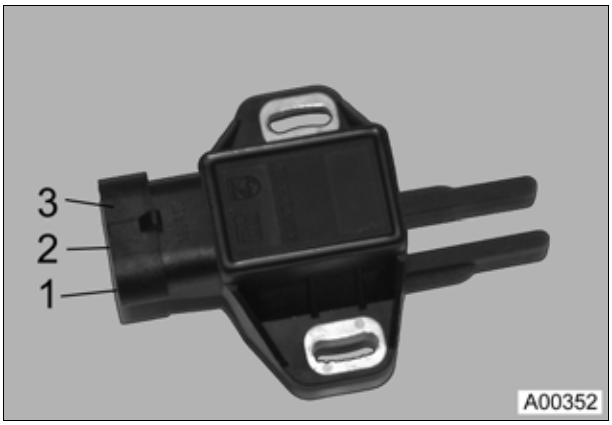


Fig. 228. I001451

NOTE: *Connect the X899.980.246.205 adapter cable directly to the **B040** - Sensor, front power lift position.*
Ignition ON.
All readings +/- 10%

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	2	8.5 VDC		Microfuse (no. 12) in A013 or within wiring set
Earth	1			
Signal	3	3.8 VDC	Front power lift lowered	
		0.7 VDC	Front power lift raised	
Earth	1			

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Signal	38
Sensor system earth	45

NOTE: *see §25*
see §34

Measuring power consumption
Draw out bridge at pin 38 (on X1403) on adapter box.
Measure pin 38 with multimeter (ampere meter).
Front power lift lowered = 18 mADC
Front power lift raised = 3.5 mADC

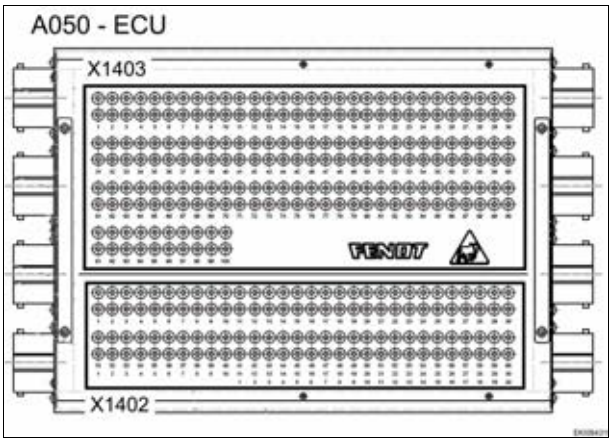


Fig. 229. I001874

Possible cause of fault

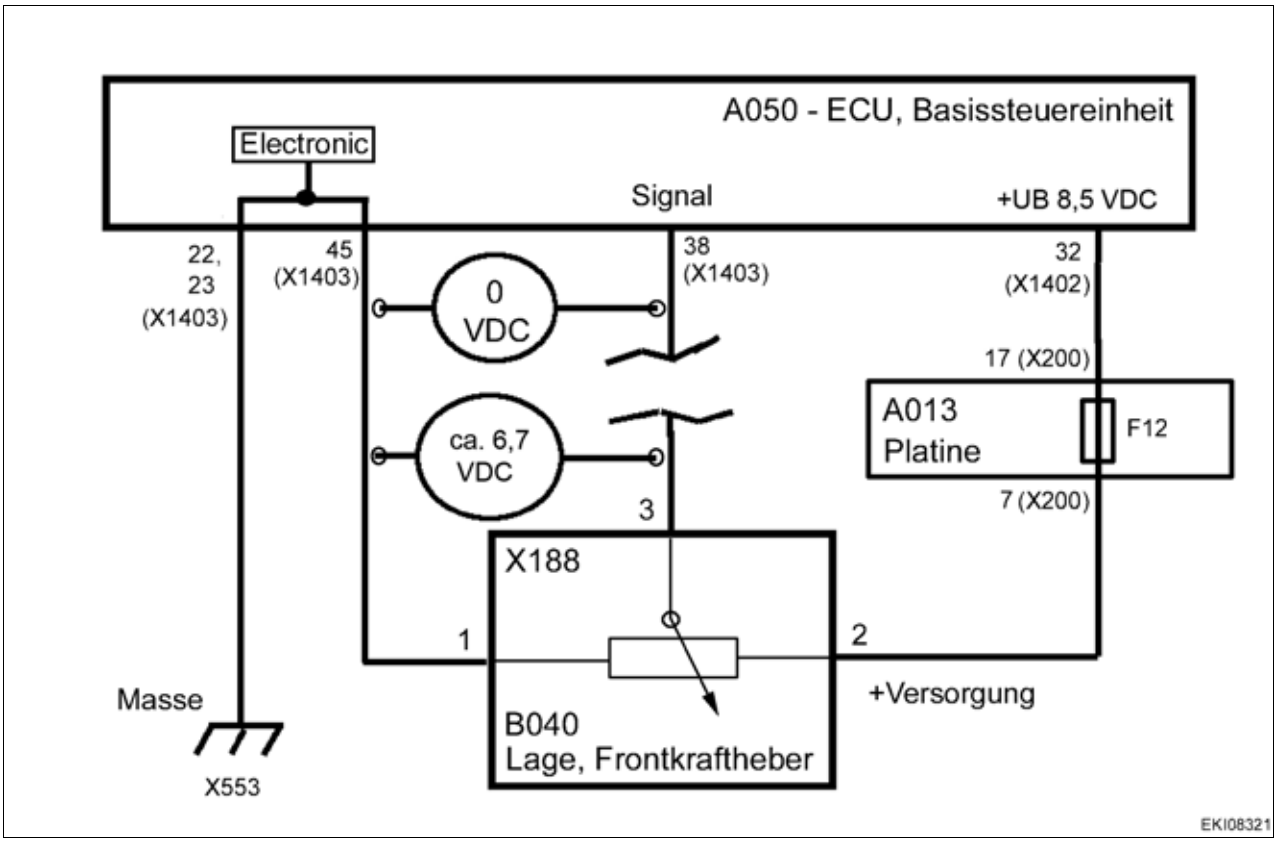


Fig. 230. I001953

NOTE: *The B040 position sensor must be calibrated.*
see §3

63 B055 sensor, foot throttle

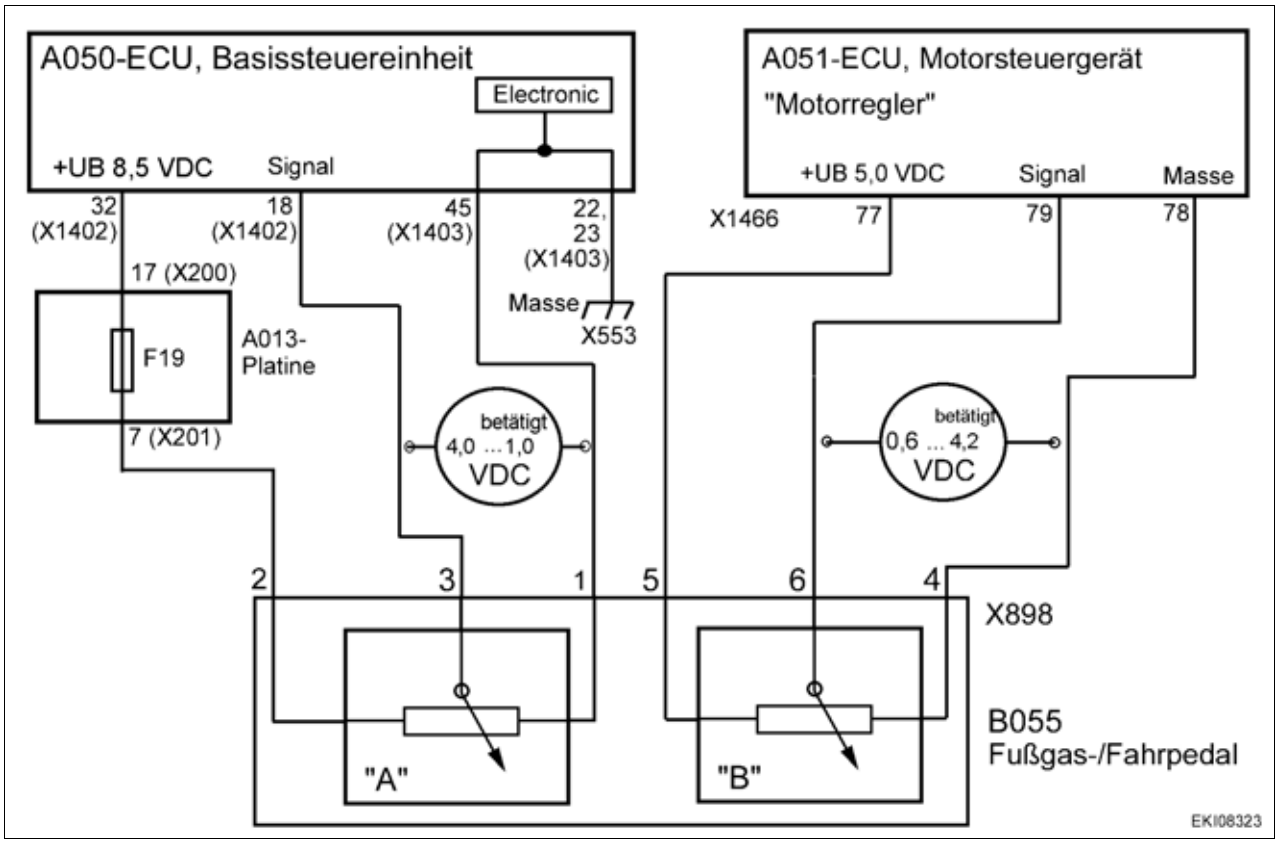


Fig. 231. I002054

Item	Designation	Note
A013 - PCB, microfuses **(microfuse no. 19)**		
X200	Separation point on A013 PCB_microfuse	
X201	Separation point on A013 PCB_microfuse	
Pin 17 (X200)	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 7 (X201)	+ supply for the B055 sensor (8.5 VDC)	Switch on ignition.
A050 - ECU, basic control unit		
X1402	Separation point on the A050 ECU, basic control unit	
X1403	Separation point on the A050 ECU, basic control unit	
Pin 32 (X1402)	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 18 (X1402)	Signal	
Pin 45 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
B055 - Sensor, foot throttle		
X898	Separation point on B055 sensor	
Pin 1	Earth (on the A050 ECU, basic control unit)	
Pin 2	+ supply (8.5 VDC)	Switch on ignition.
Pin 3	Signal (on the A050 ECU, basic control unit)	
Pin 4	Earth (on the A051 ECU, engine control unit)	
Pin 5	+ supply (5.0 VDC)	Switch on ignition.

Item	Designation	Note
Pin 6	Signal (on the A051 ECU, engine control unit)	
X553 earth pin		

Functional description of **B055** - Sensor, foot throttle
NOTE: *see §5*

Measuring points and signal values (B055 sensor "Part A")

Measuring points on the B055 - Sensor, foot throttle	
Pin	**Function**
1	Earth
2	+ supply
3	Signal



Fig. 232. I001074

NOTE: *Connect the X899.980.246.208 adapter cable directly to the **B055** - Sensor, foot throttle.*
Ignition ON.
All readings +/- 10%

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	2	8.5 VDC		Microfuse (no. 19) in A013 or within wiring set
Earth	1			
Signal	3	4.0 VDC	Pedal not operated	
		1.0 VDC	Pedal fully depressed	
Earth	1			

Measuring point on A050 - ECU, basic control unit (X1402 + X1403 separation points)	
Function	**Pin**
Signal	18 (X1402)
Sensor system earth	45 (X1403)

NOTE: *see §31*
see §34

Possible cause of fault

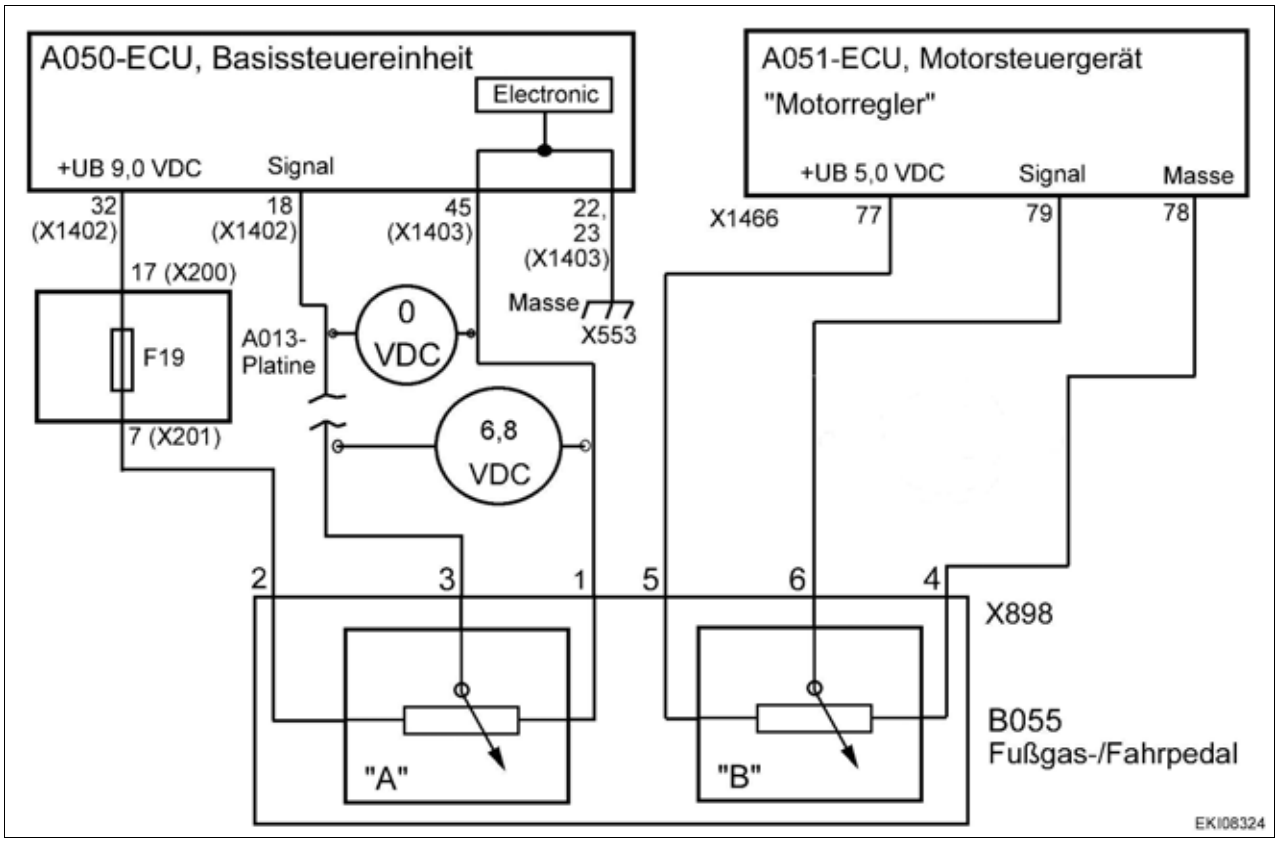


Fig. 233. I002055

NOTE: *The **B055** - Sensor, foot throttle must be calibrated*
see §14

Measuring points and signal values (B055 sensor "Part B")

Measuring points on the B055 - Sensor, foot throttle	
Pin	**Function**
4	Earth
5	+ supply
6	Signal



Fig. 234. I001074

NOTE: *Connect the X899.980.246.208 adapter cable directly to the **B055** - Sensor, foot throttle.*
Ignition ON.
All readings +/- 10%

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	5	5.0 VDC		
Earth	4			

Test	Pin	Specified value	condition	Possible cause of fault
Signal	3	0.55 to 0.65 VDC	Pedal not operated	
		4.0 to 4.5 VDC	Pedal fully depressed	
Earth	1			

Measuring point on the A051 - ECU, engine control unit (EDC 7). (X1466 separation point)	
Function	**Pin**
+ supply	77
Signal	79
Sensor system earth	78

NOTE: *see §36*
see §37

Possible cause of fault

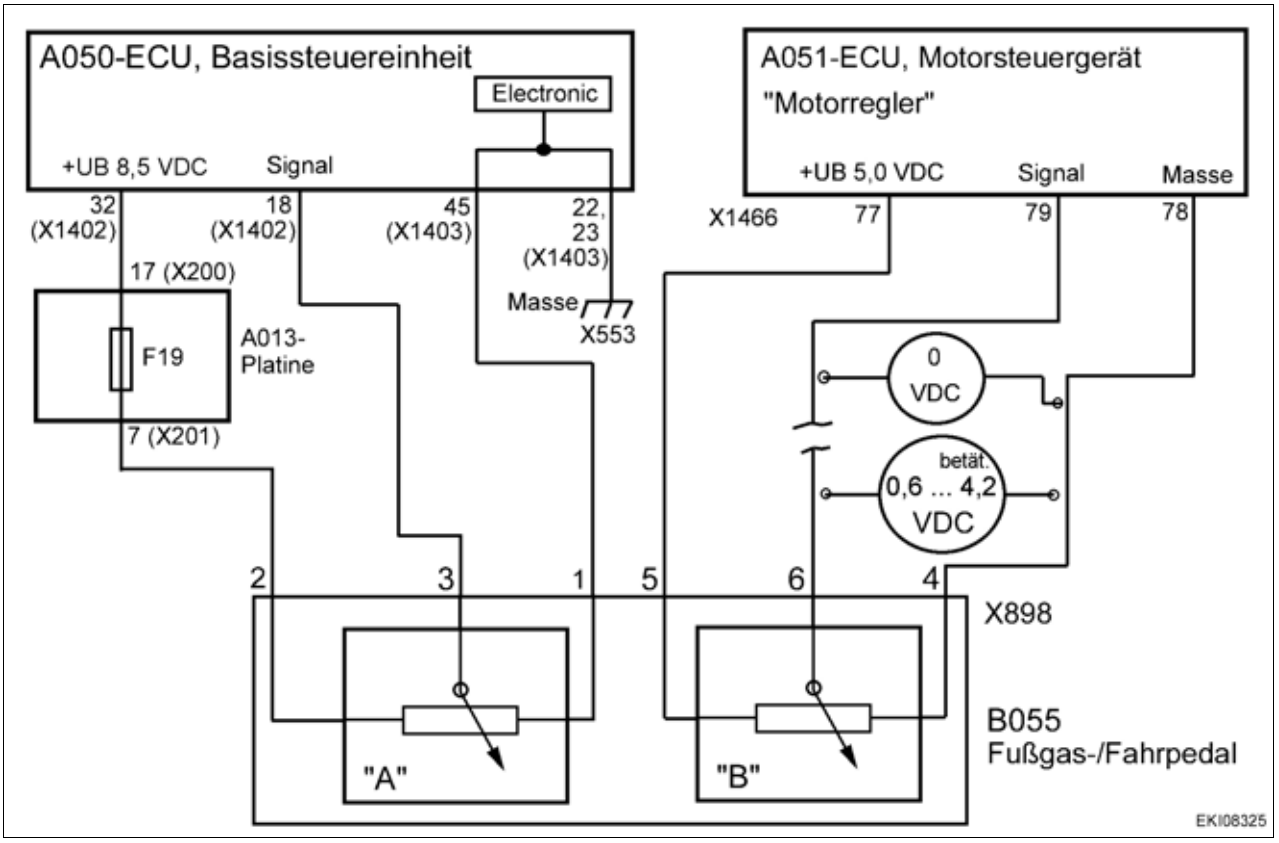


Fig. 235. I002056

NOTE: *The **B055** - Sensor, foot throttle must be calibrated*
see §14

64 B019/B060 compressed air supply sensor

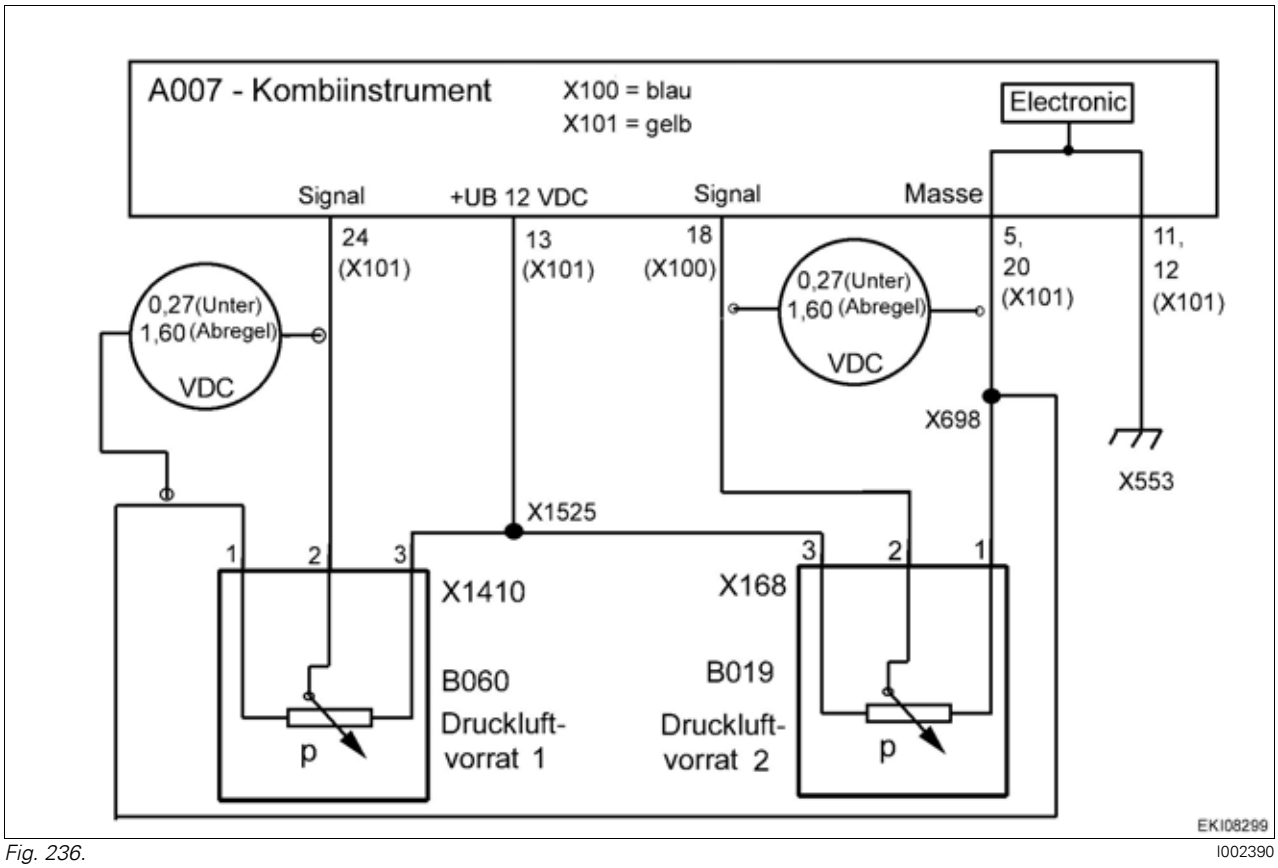


Fig. 236. I002390

Item	Designation	Note
A007 - Instrument panel		
X100	"Blue" separation point on **A007** - Instrument panel	
X101	"Yellow" separation point on **A007** - Instrument panel	
Pin 13 (X101 "yellow")	+ supply for B019/B060 sensor (12 VDC)	Switch on ignition.
Pin 18 (X100 "blue")	Signal from B019 sensor	In 2-circuit brake system only.
Pin 24 (X101 "yellow")	Signal from B060 sensor	
Pins 5 and 20 (X101 "yellow")	Sensor system earth	
Pins 11 and 12 (X101 "yellow")	Electronics earth	
B019 - Sensor, compressed air supply **(Fitted in 2-circuit brake system only)**		
X168	Separation point on B019 sensor	
Pin 1	Earth	
Pin 2	Signal	
Pin 3	+ supply (12 VDC)	Switch on ignition.
B060 - Compressed air supply sensor		
X1410	Separation point on B060 sensor	
Pin 1	Earth	
Pin 2	Signal	
Pin 3	+ supply (12 VDC)	Switch on ignition.

Item	Designation	Note
X553 earth pin		
X698 connector (sensor system earth)		
X1525 connector (+UB 12 VDC)		

Measuring points and signal values

Measuring points on B019/B060 compressed air supply sensor	
Pin	**Function**
1	Earth
2	Signal
3	+ supply

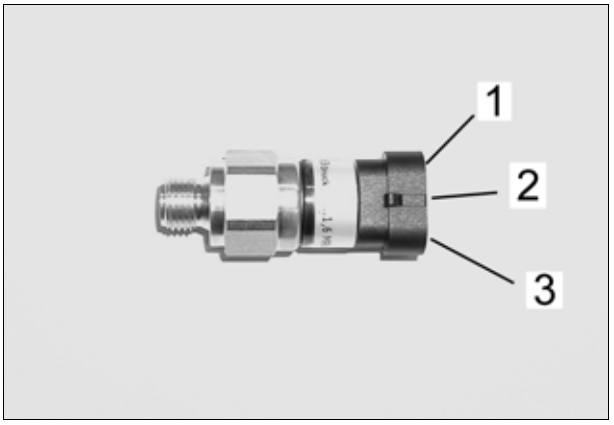


Fig. 237. I000647

NOTE: *Connect the X 899.980.246.205 adapter cable directly to the B019/B060 sensor.*

With 1-circuit brake system (rear wheel brake and 4WD engagement),
check reservoir pressure in circuit 1
Release pressure in compressed air provision system.
Connect testing manometer to **testing connection (C).**
Measure pin 1 (earth) and pin 2 (signal) on **B060** - Compressed air supply sensor.
Start engine.

NOTE: *The pressure controller must blow off at approx. 8.4 bar.*

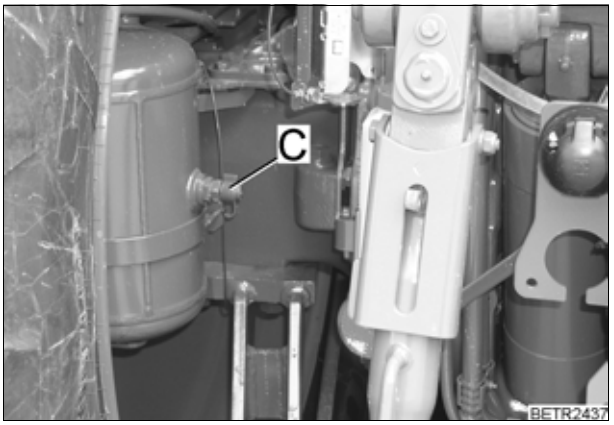


Fig. 238. I001460

With 2-circuit brake system (rear wheel brake and front wheel brake),
check reservoir pressure in circuit 1 (rear wheel brake) (pos.B)
Release pressure in compressed air provision system.
Connect testing manometer to **testing connection (B).**
Measure pin 1 (earth) and pin 2 (signal) on **B060** - Compressed air supply sensor.
Start engine.

Check reservoir pressure in circuit 2 (front wheel brake) (pos.D)
Release pressure in compressed air provision system.
Connect testing manometer to **testing connection (D).**
Measure pin 1 (earth) and pin 2 (signal) on **B019** - Sensor, compressed air supply.
Start engine.

NOTE: *The pressure controller must blow off at approx. 8.4 bar.*

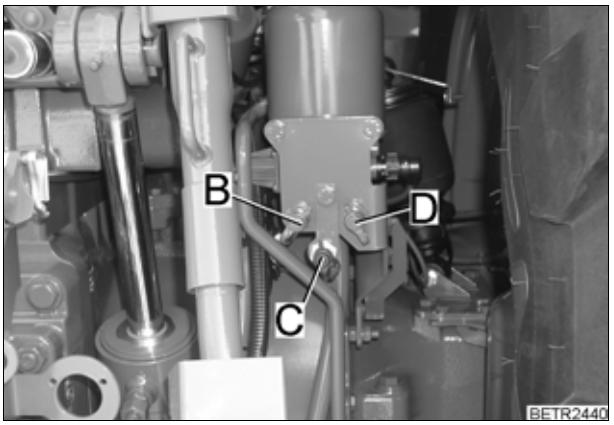


Fig. 239. I001461

Note: all measurement values are approx. values		
Voltage	**Pressure**	**Display on A007 instrument panel**
0.34 VDC	0 bar	1 bar flashing
0.40 VDC	1,5 bar	1 bar
0.51 VDC	2,1 bar	2 bars
0.65 VDC	2,9 bar	3 bars
0.80 VDC	3,7 bar	4 bars
0.94 VDC	4,5 bar	5 bars
1.09 VDC	5,4 bar	6 bars
1.24 VDC	6,2 bar	7 bars
1.37 VDC	6,9 bar	8 bars
1.57 VDC	8,4 bar	9 bars

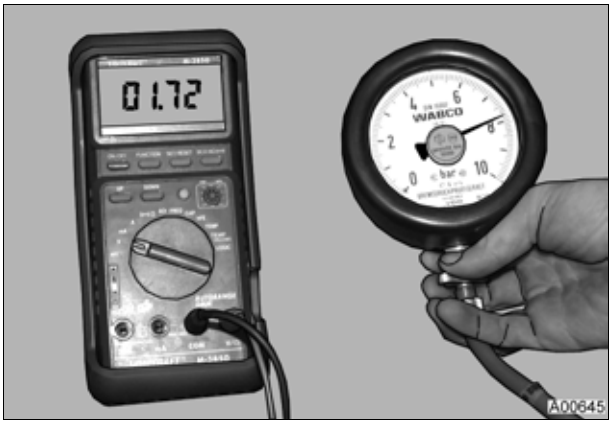


Fig. 240. I001457

Checking display (compressed air supply) in A007 instrument panel

Connect X899.980.208.100 e-adapter box to the A007 instrument panel using X899.980.208.204 adapter cable	
Pin at separation point	Pin on the adapter box (68-pin)
X101 separation point "yellow" (1 to 26)	1 to 26
X100 separation point "blue" (1 to 26)	31 to 56

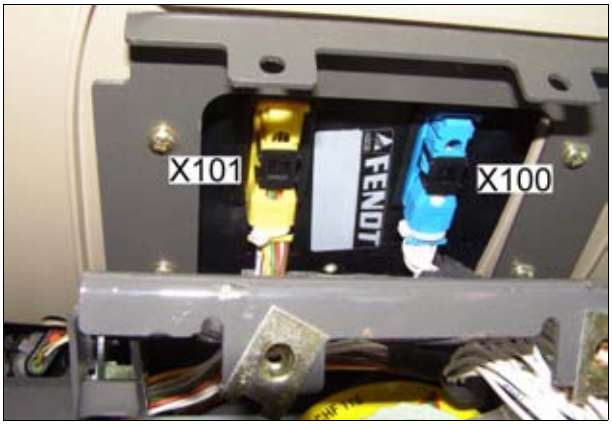


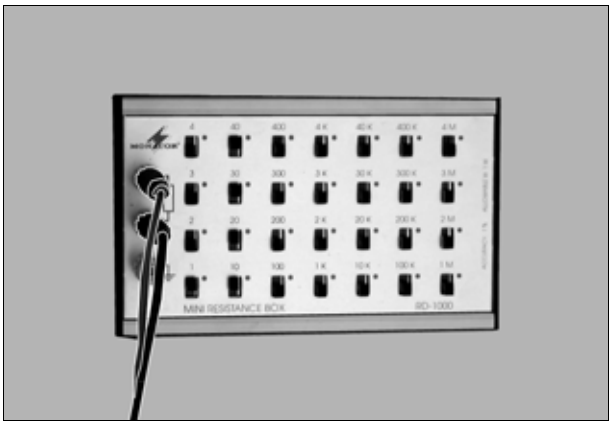
Fig. 241. I001226

NOTE: *see §1*

Check the compressed air supply display on A007 - Instrument panel

Connect X899.980.246.205 adapter cable directly to the component (B019 or B060).
The connection to the sensor remains open.
Connect the X 899.980.224 resistance decade.
and select corresponding resistance (see table below).
Switch on ignition.

NOTE: *Both sensors, **B019** - Sensor, compressed air supply and **B060** - Compressed air supply sensor are monitored by **A007** - Instrument panel. The lower pressure is always displayed.*


Fig. 242. I000650

Check the warning message for compressed air supply on A007 - Instrument panel
Connect X899.980.246.205 adapter cable directly to the component (B019 or B060).
The connection to the sensor remains open.
Connect the X 899.980.224 resistance decade.
and select corresponding resistance (see table below).
Switch on ignition.

NOTE: *Both sensors, **B019** - Sensor, compressed air supply and **B060** - Compressed air supply sensor are monitored by **A007** - Instrument panel. If one of the pressures falls below the warning limit, an error message will appear with the corresponding error code.*

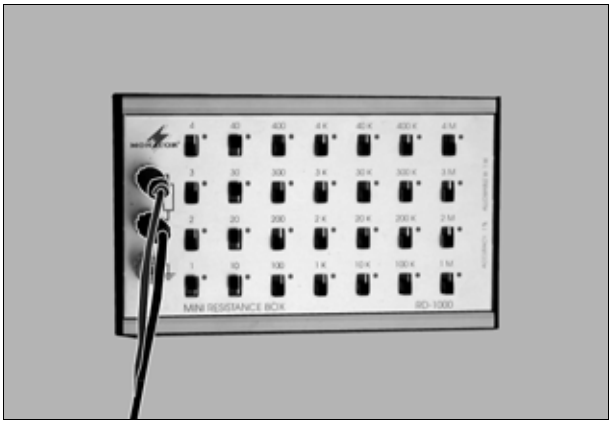


Fig. 243. I000650

The compressed air supply is displayed on **A007** - Instrument panel (A)
If the pressure in the reservoir is too low, a warning message is displayed.

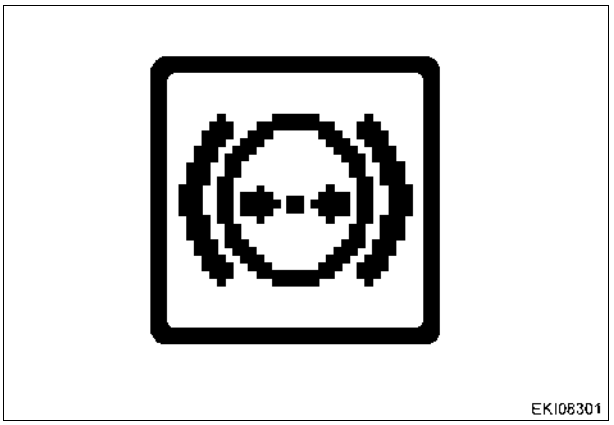


Fig. 244. I001467

Note: all measurement values are approx. values		
Resistance	**Voltage**	**Display on A007 instrument panel**
20 ohms	0.34 VDC	1 bar flashing
25 ohms	0.40 VDC	1 bar
32 ohms	0.51 VDC	2 bars
41 ohms	0.65 VDC	3 bars
50 ohms	0.80 VDC	4 bars
59 ohms	0.94 VDC	5 bars
68 ohms	1.09 VDC	6 bars
77 ohms	1.24 VDC	7 bars
86 ohms	1.37 VDC	8 bars
96 ohms	1.57 VDC	9 bars

Further checks on compressed air system
NOTE: *see §1*
see §2
see §3

Leak-testing the compressed air system
The display on the A007 instrument panel must remain unchanged for at least **3 minutes** with the engine stopped and the reservoir full.

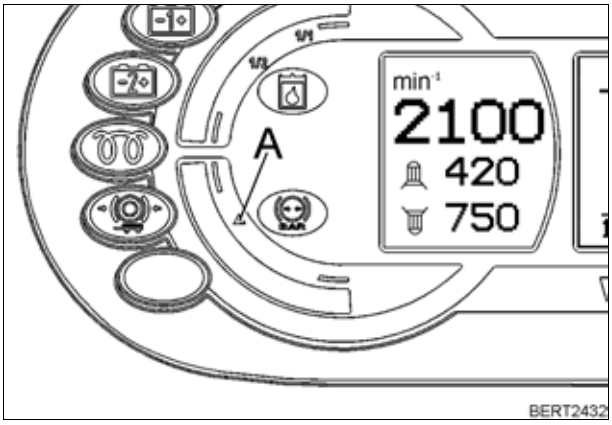


Fig. 245. I001454

NOTE: *Try not to move the cab (avoid climbing in and out) in such an event, as the pneumatic cab suspension will attempt to adjust accordingly and thus use air.*

65 B063 filter contamination pressure switch (hydraulic circuit)

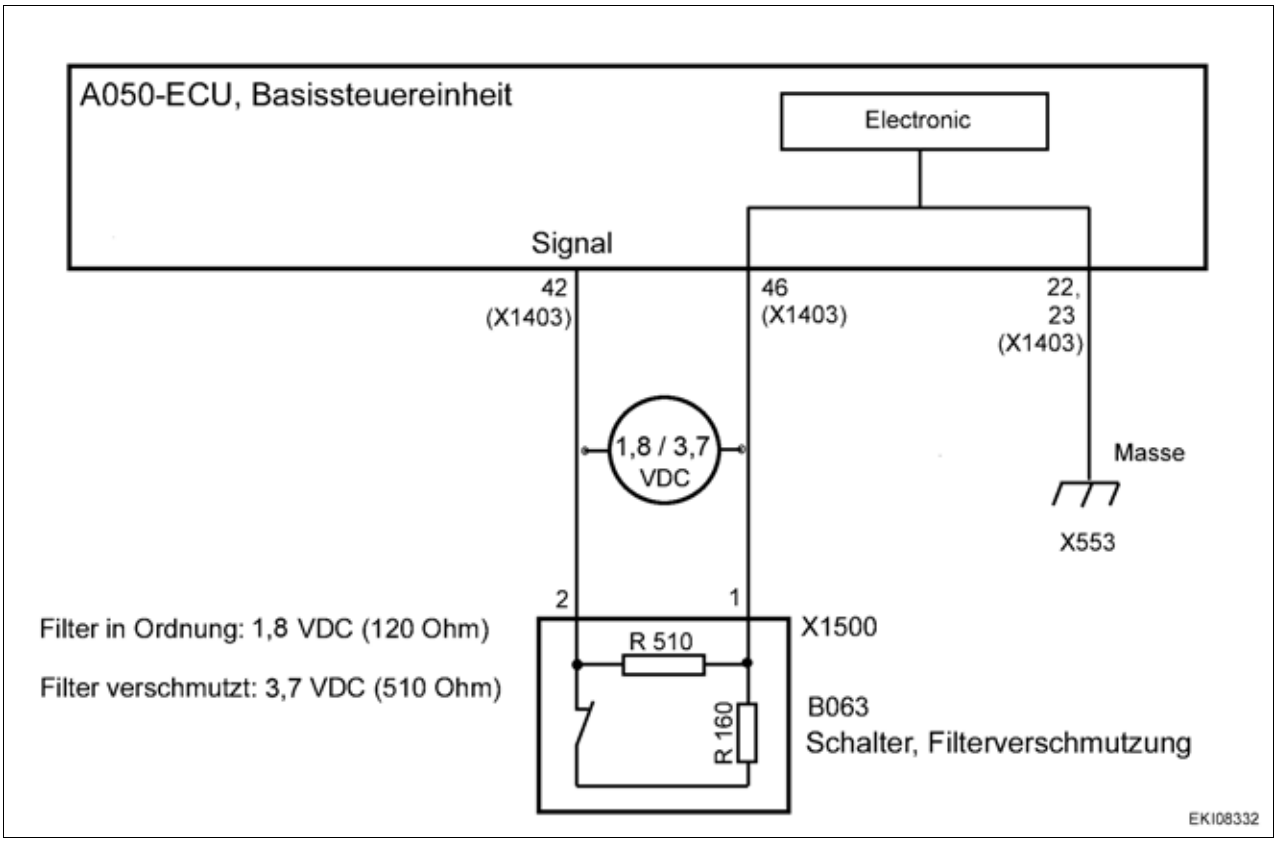


Fig. 246. I001956

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on the A050 ECU, basic control unit	
Pin 46 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
Pin 42 (X1403)	Signal	
B063 - Pressure switch, filter contamination (hydraulic circuit)		
X1500	Separation point at B063	
Pin 1	Earth	
Pin 2	Signal	
X553 earth pin		

Measuring points and signal values

Measuring points on the B063 - Pressure switch, filter contamination (hydraulic circuit)	
Pin	**Function**
1	Earth
2	Signal



Fig. 247. I001078

NOTE: *Connect the X899.980.246.204 adapter cable directly to the **B063** - Pressure switch, filter contamination (hydraulic circuit).*
Ignition ON.
All readings +/- 10%

Test	Pin	Specified value	condition	Possible cause of fault
Signal	2			
		1.8 VDC	Hydraulic oil filter OK (switch closed: 120 ohms)	
		3.7 VDC	Hydraulic oil filter clogged (switch open: 510 ohms)	
Earth	1			

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Signal	42
Earth	46

NOTE: *see §21*
see §34

Hydraulic oil filter clogged
Display accompanied by warning light.

NOTE: *A warning message will appear on the **A013** - PCB, microfuses if:*

- *The hydraulic oil temperature is > 40°C and*
- *pressure > 2 bar is exerted for longer than 10 seconds*

NOTE: *When display appears, replace filter element as soon as possible.*
The display may disappear again,
but filter element must still be replaced.

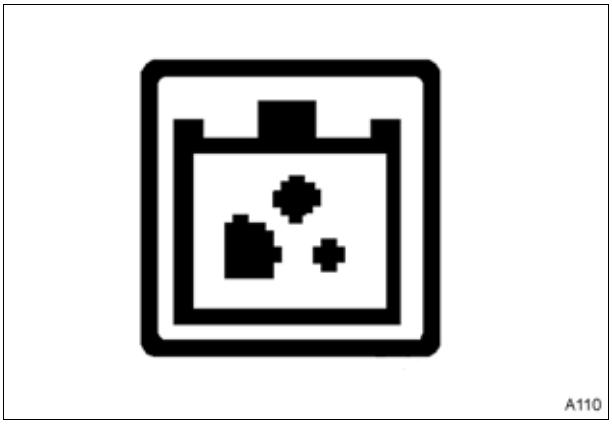


Fig. 248. I001964

Possible cause of fault

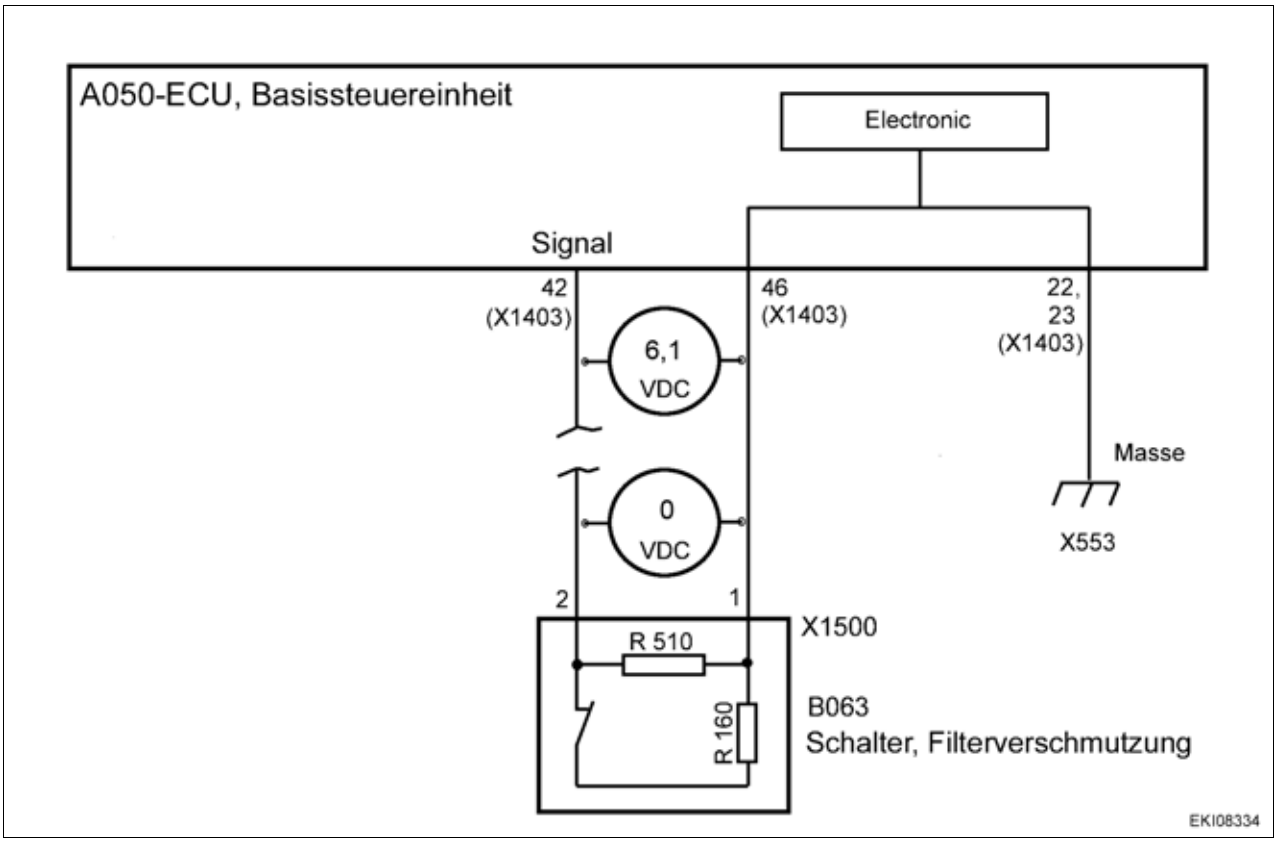


Fig. 249. I001957

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66 B066 left wheel position sensor

NOTE: *The position of the front axle is detected by 2 sensors:*
***B066** - Sensor, wheel position (left)*
***B068** - Sensor, wheel position (right)*
See also:
see §68

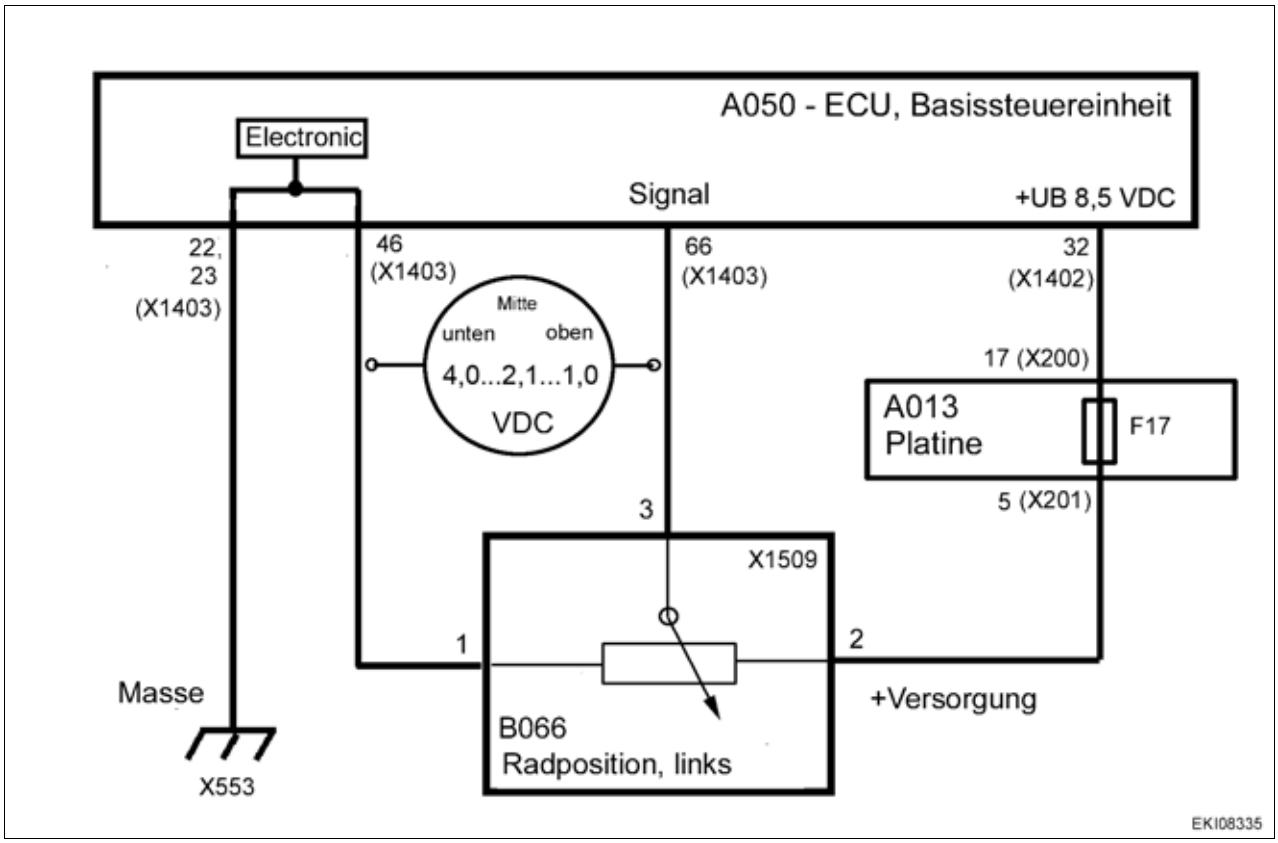


Fig. 250. I001958

Item	Designation	Note
A013 - PCB, microfuses **(microfuse no. 17)**		
X200	Separation point on A013 PCB_microfuse	
X201	Separation point on A013 PCB_microfuse	
Pin 17 (X200)	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 5 (X201)	+supply for the B066 sensor (8.5 VDC)	Switch on ignition.
A050 - ECU, basic control unit		
X1402	Separation point on the A050 ECU, basic control unit	
X1403	Separation point on the A050 ECU, basic control unit	
Pin 32 (X1402)	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 66 (X1403)	Signal	
Pin 46 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
B066 - Sensor, wheel position (left)		
X1509	Separation point on B066 sensor	
Pin 1	Earth	

Item	Designation	Note
Pin 2	+ supply (8.5 VDC)	Switch on ignition.
Pin 3	Signal	
X553 earth pin		

Measuring points and signal values

Measuring points on B066 left wheel position sensor	
Pin	**Function**
1	Earth
2	+ supply
3	Signal

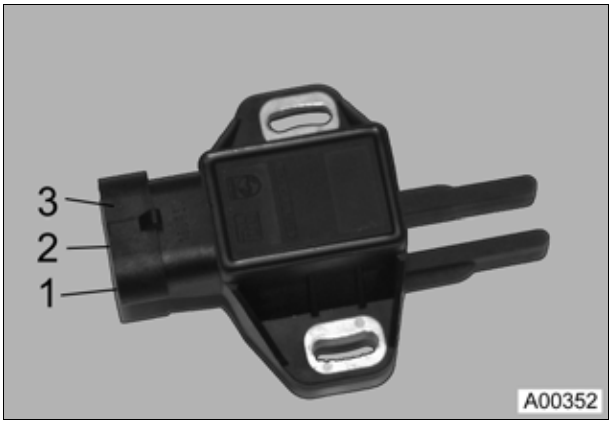


Fig. 251. I001451

NOTE: *Connect the X899.980.246.205 adapter cable directly to the **B066** - Sensor, wheel position (left).*
Ignition ON.
All readings +/- 10%

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	2	8.5 VDC		Microfuse (no. 17) in A013 or within wiring set
Earth	1			
Signal	3	approx. 2.1 VDC	Front axle in central position	
		4.0 VDC	Front axle lowered	
		1.0 VDC	Front axle raised	
Earth	1			

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Signal	66
Earth	46

NOTE: *see §26*
see §27
see §34

Measuring power consumption
Draw out bridge at pin 66 (on X1403) on adapter box.
Measure pin 66 with multimeter (ampere meter).
Front axle in central position = 10.6 mADC.
Front axle in lower limit position = 19.6 mADC.
Front axle in upper limit position = 4.9 mADC.

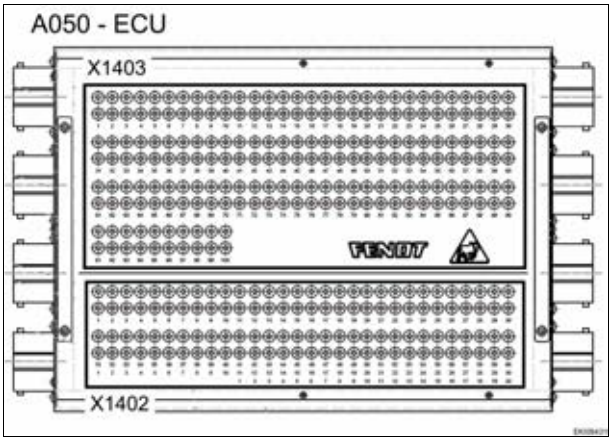


Fig. 252. I001874

WARNING: When the tractor is stationary, raising or lowering the tractor body is dangerous for people in the vicinity of the front axle.

Possible cause of fault

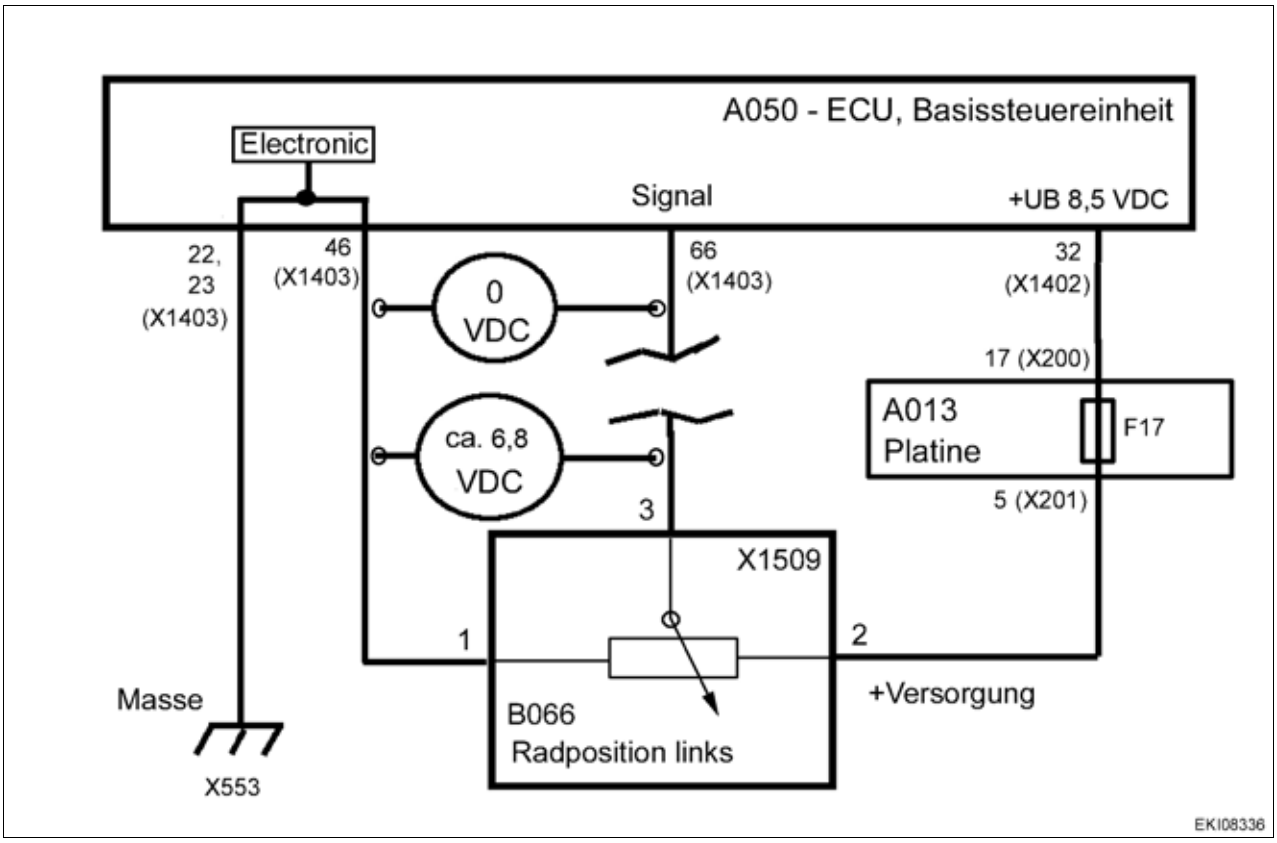


Fig. 253. I001959

NOTE: *The **B066** - Sensor, wheel position (left) must be calibrated*
see §6

67 B067 sensor, steering angle

The B067 steering angle sensor is required for:

- **Controlling 4WD shifting**
- **Controlling the diff. lock shift**
- **Control of Autoguide system (automatic track guide)**

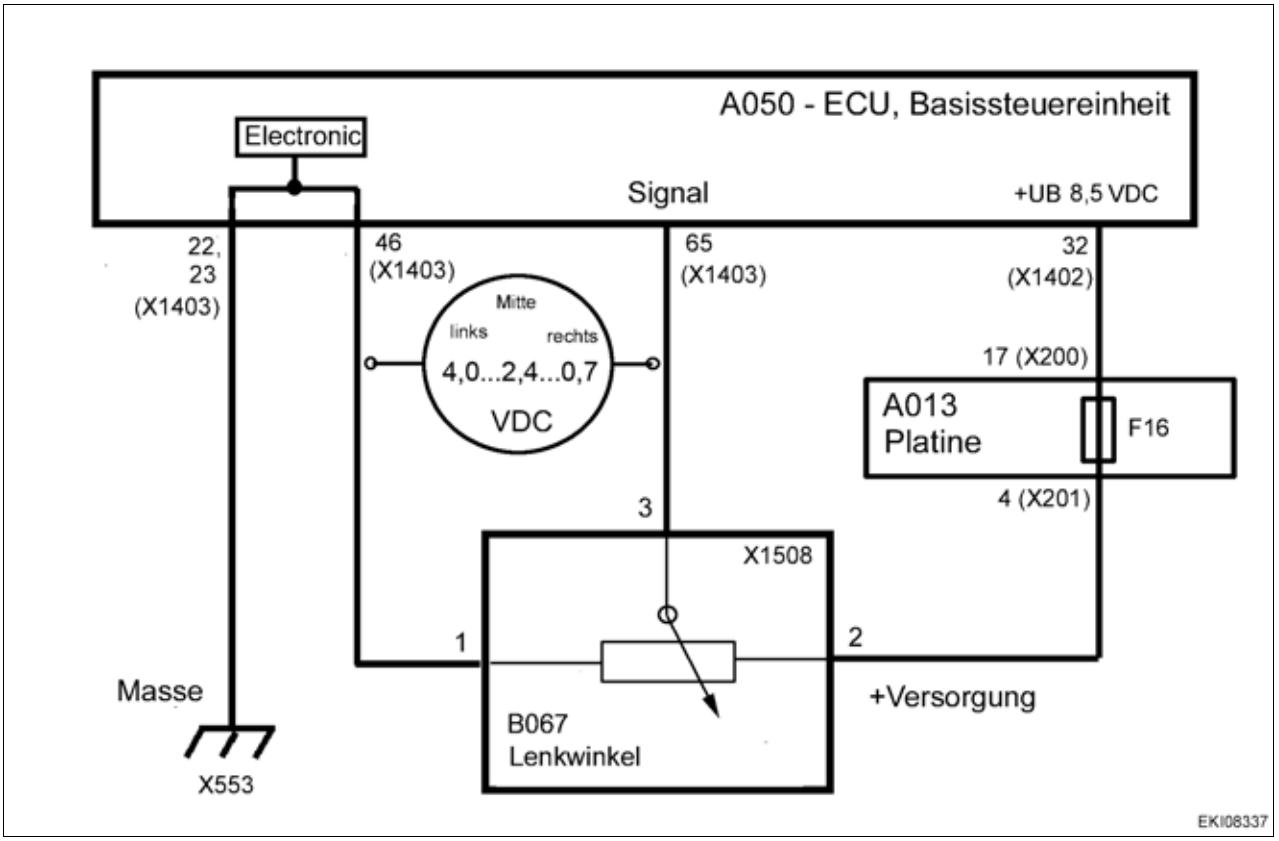


Fig. 254. I001960

Item	Designation	Note
A013 - PCB, microfuses **(microfuse no. 16)**		
X200	Separation point on A013 PCB_microfuse	
X201	Separation point on A013 PCB_microfuse	
Pin 17 (X200)	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 4 (X201)	+supply for the B066 sensor (8.5 VDC)	Switch on ignition.
A050 - ECU, basic control unit		
X1402	Separation point on the A050 ECU, basic control unit	
X1403	Separation point on the A050 ECU, basic control unit	
Pin 32 (X1402)	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 65 (X1403)	Signal	
Pin 46 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
B067 - Sensor, steering angle		
X1508	Separation point on B067 sensor	
Pin 1	Earth	

Item	Designation	Note
Pin 2	+ supply (8.5 VDC)	Switch on ignition.
Pin 3	Signal	
X553 earth pin		

Measuring points and signal values

Measuring points on B067 steering angle sensor	
Pin	**Function**
1	Earth
2	+ supply
3	Signal

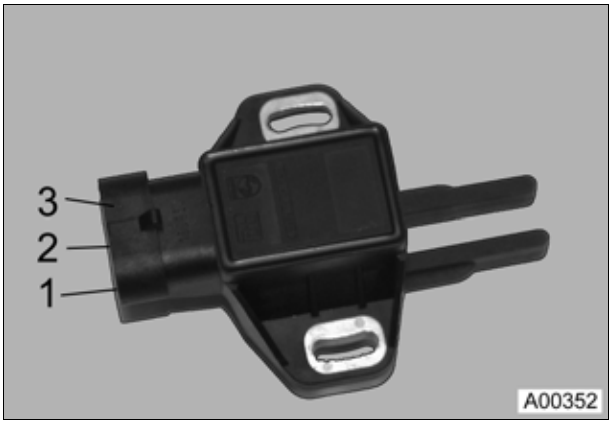


Fig. 255. I001451

NOTE: *Connect the X899.980.246.205 adapter cable directly to the **B067** - Sensor, steering angle.*
Ignition ON.
All readings +/- 10%

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	2	8.5 VDC		Microfuse (no. 16) in A013 or within wiring set
Earth	1			
Signal	3	4.0 VDC	Steering turned to the left	
		2.4 VDC	Steering in centre position **Note:** Set the wheels straight and advance the tractor slowly, the steering will find the centre position.	
		0.7 VDC	Steering turned to the right	
Earth	1			

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Signal	65
Earth	46

NOTE: *see §30*
see §34

Measuring power consumption
Draw out bridge at pin 65 (on X1403) on adapter box.
Measure pin 65 with multimeter (ampere meter).
To left steering stop = 19 mADC.
Set the wheels straight = 12 mADC.
To right steering stop = 3.6 mADC.

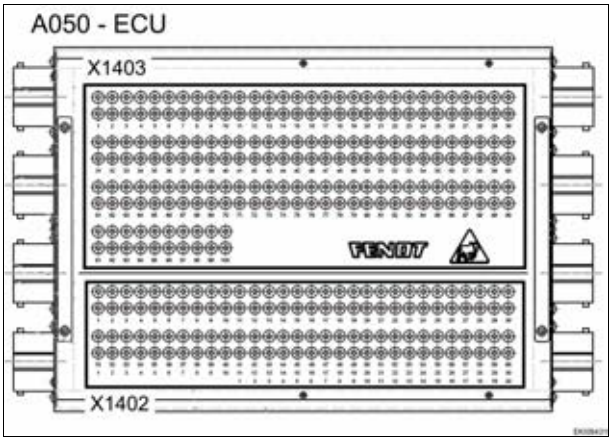


Fig. 256. I001874

Possible cause of fault

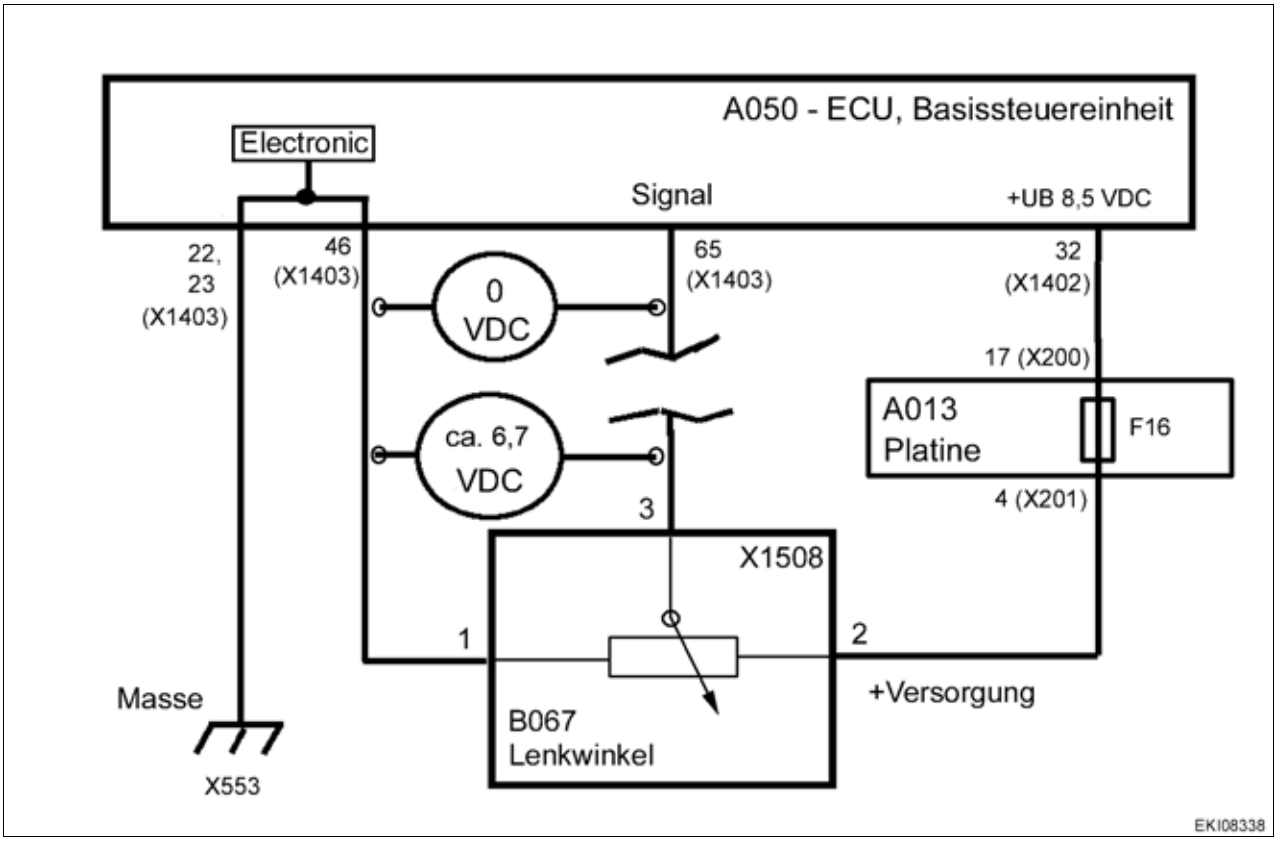


Fig. 257. I001961

NOTE: *The B067 steering angle sensor must be calibrated.*
see §7

68 B068 right wheel position sensor

NOTE: *The position of the front axle is detected by 2 sensors:*
***B066** - Sensor, wheel position (left)*
***B068** - Sensor, wheel position (right)*
see §66

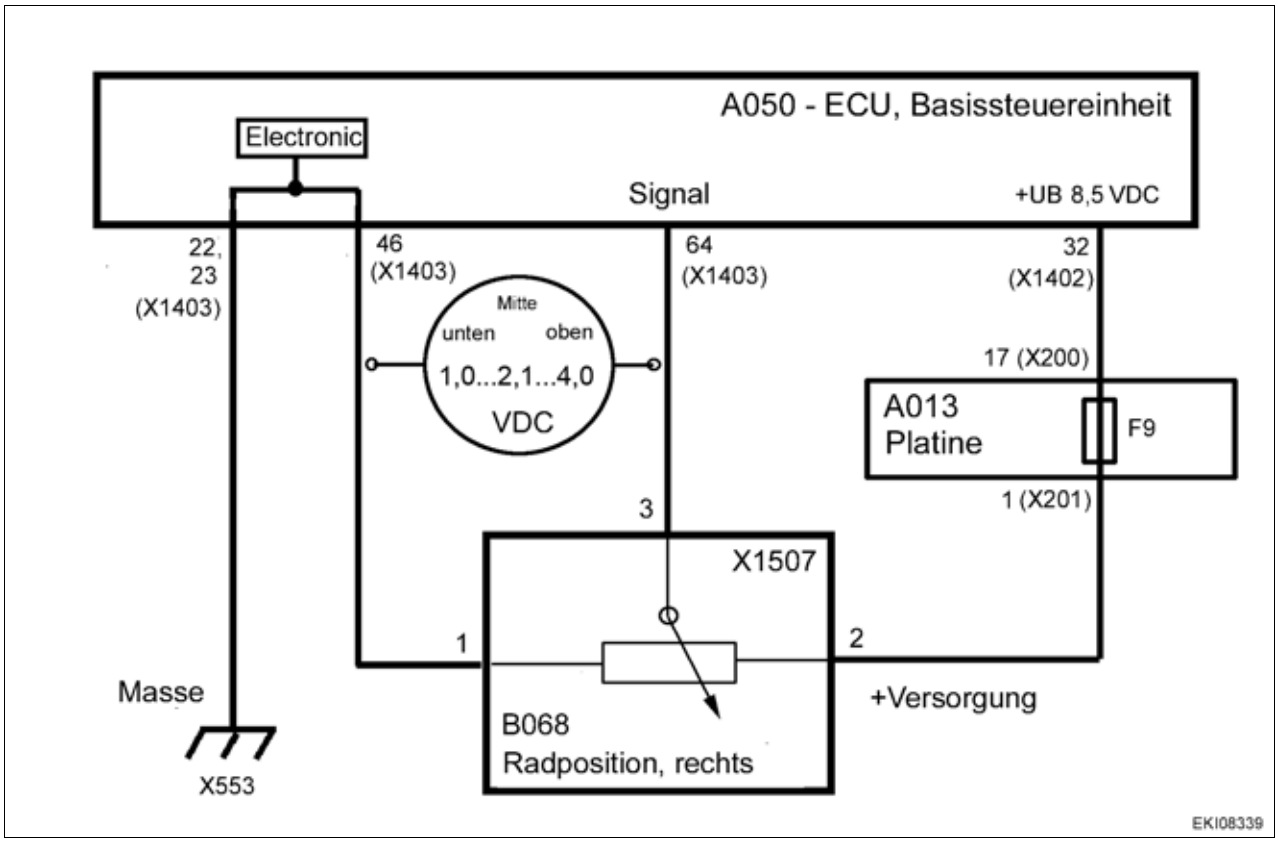


Fig. 258. I001963

Item	Designation	Note
A013 - PCB, microfuses **(microfuse no. 9)**		
X200	Separation point on A013 PCB_microfuse	
X201	Separation point on A013 PCB_microfuse	
Pin 17 (X200)	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 1 (X201)	+supply for the B068 sensor (8.5 VDC)	Switch on ignition.
A050 - ECU, basic control unit		
X1402	Separation point on the A050 ECU, basic control unit	
X1403	Separation point on the A050 ECU, basic control unit	
Pin 32 (X1402)	+ supply for the A013 PCB microfuse (8.5 VDC)	Switch on ignition.
Pin 64 (X1403)	Signal	
Pin 46 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
B068 - Sensor, wheel position (right)		
X1507	Separation point on B068 sensor	
Pin 1	Earth	
Pin 2	+ supply (8.5 VDC)	Switch on ignition.

Item	Designation	Note
Pin 3	Signal	
X553 earth pin		

Measuring points and signal values

Measuring points on the B068 - Sensor, wheel position (right)	
Pin	**Function**
1	Earth
2	+ supply
3	Signal

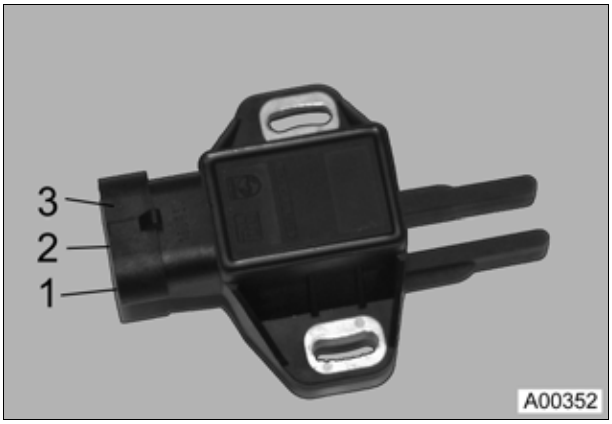


Fig. 259. I001451

NOTE: *Connect the X899.980.246.205 adapter cable directly to the **B068** - Sensor, wheel position (right).*
Ignition ON.
All readings +/- 10%

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	2	8.5 VDC		Microfuse (no. 9) in A013 or within wiring set
Earth	1			
Signal	3	approx. 2.1 VDC	Front axle in central position	
		1.0 VDC	Front axle lowered	
		4.0 VDC	Front axle raised	
Earth	1			

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Signal	64
Earth	46

NOTE: *see §26*
see §27
see §34

Measuring power consumption
Draw out bridge at pin 64 (on X1403) on adapter box.
Measure pin 64 with multimeter (ampere meter).
Front axle in central position = 10.6 mADC.
Front axle in lower limit position = 4.9 mADC.
Front axle in upper limit position = 19.6 mADC.

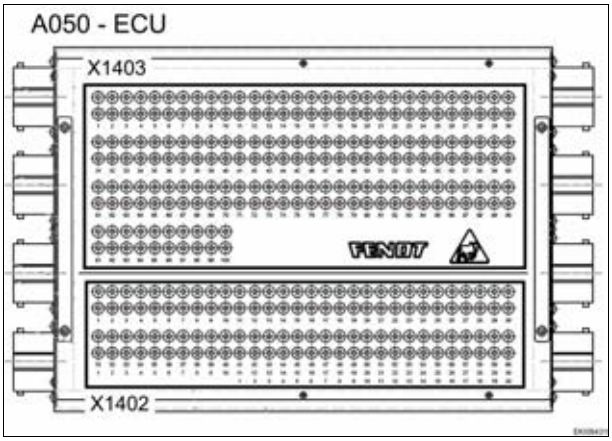


Fig. 260. I001874

WARNING: When the tractor is stationary, raising or lowering the tractor body is dangerous for people in the vicinity of the front axle.

Possible cause of fault

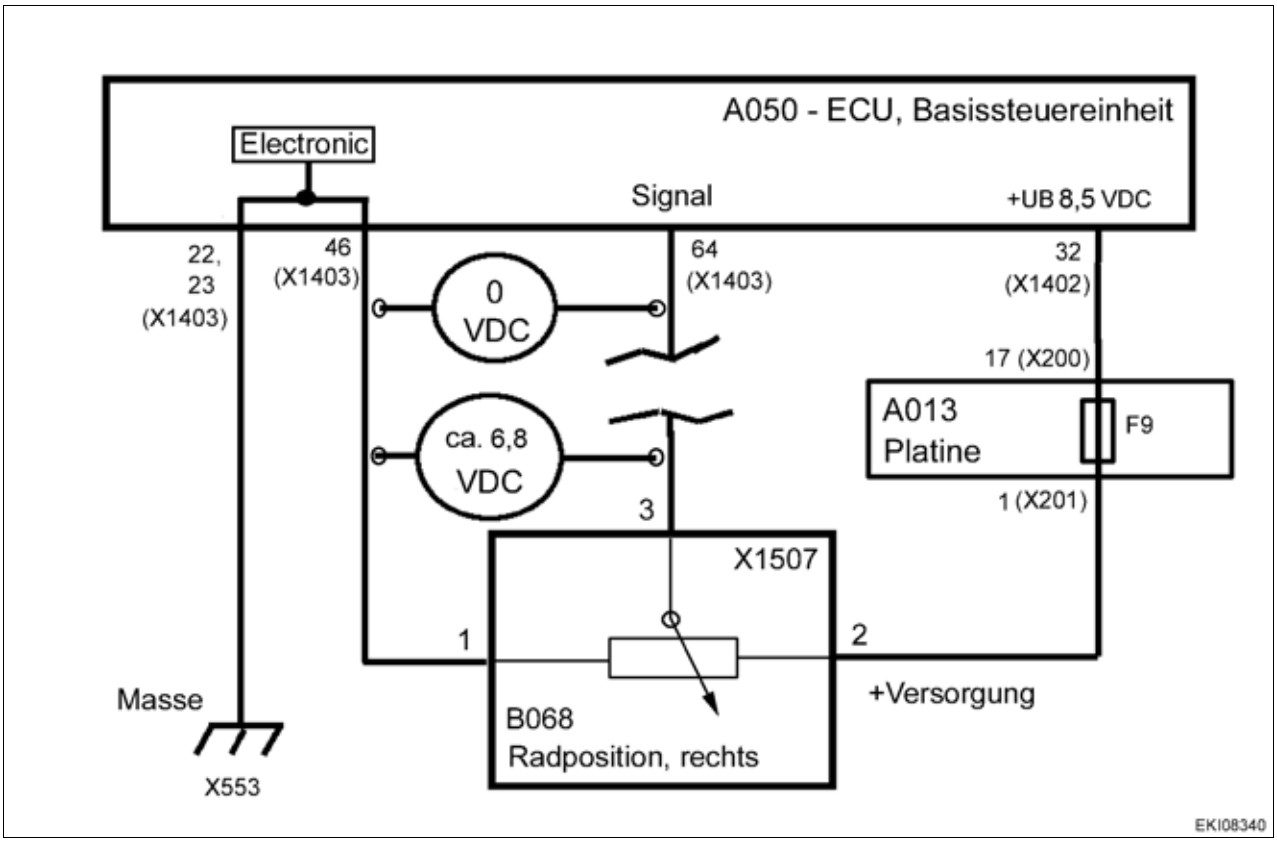


Fig. 261. I001965

NOTE: *The **B068** - Sensor, wheel position (right) must be calibrated*
see §6



Fig. 262. I001082

69 B071 output temperature sensor

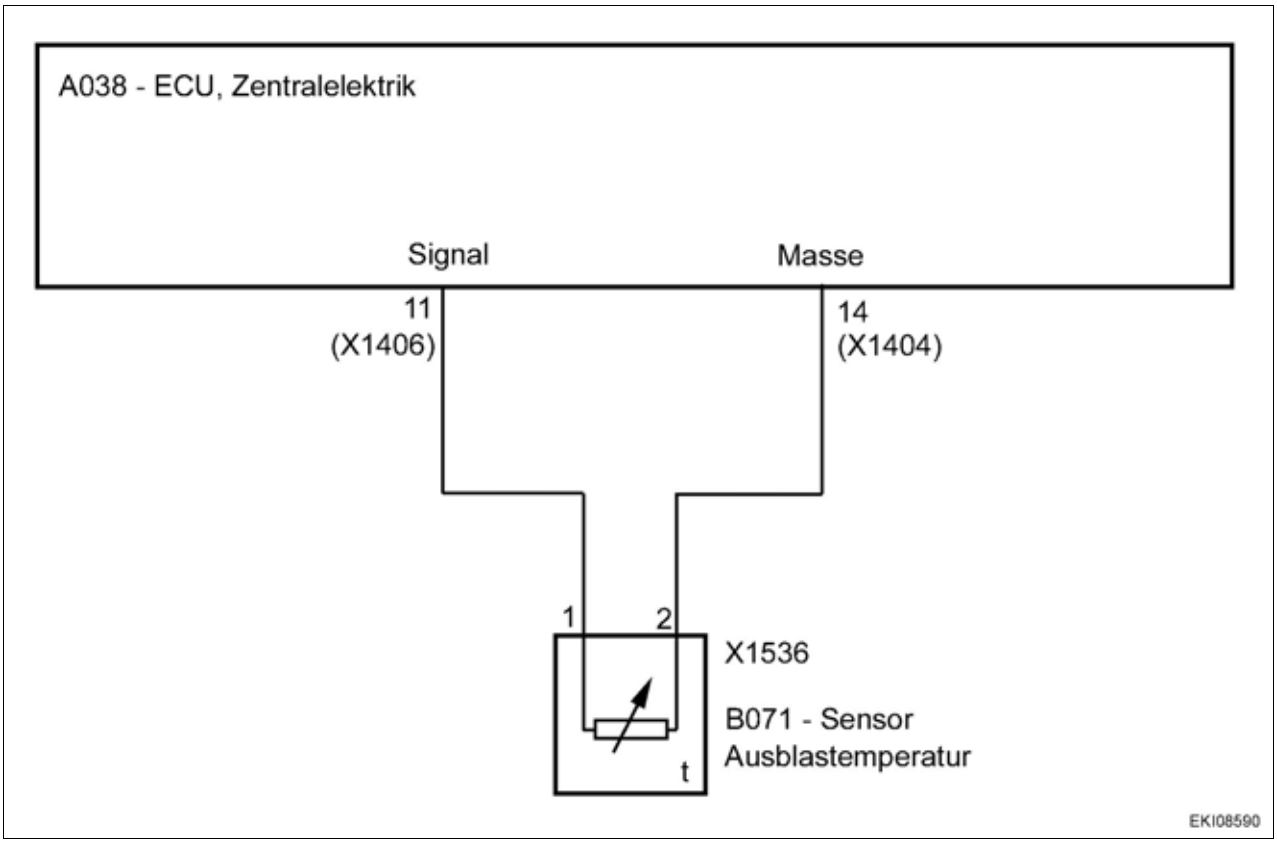


Fig. 263. I002381

Item	Designation	Note
A038 - ECU, central electrical system		
Pin 11 (X1406)	Signal	
Pin 14 (X1404)	Earth	
B071 - Sensor, output temperature		
X1536	Separation point at B071	
Pin 1	Signal	
Pin 2	Earth	

Measuring points and signal values

B071 output temperature sensor X1536 separation point	
Pin	**Function**
1	Signal
2	Earth

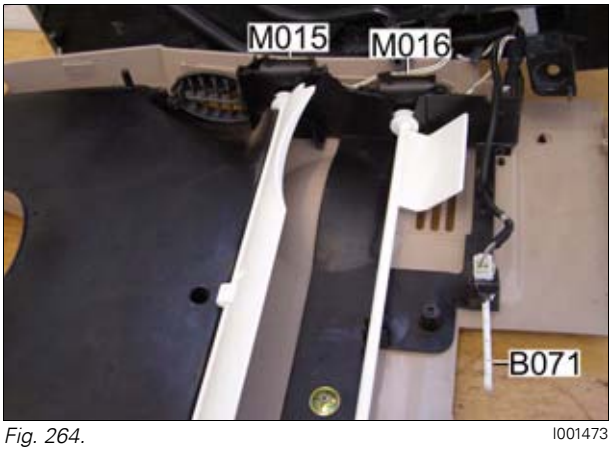


Fig. 264. I001473

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see §16*

Prerequisite for this measurement:

– Use the **vehicle earth** to **earth**

Pin	Pin description	Signal type/condition	Signal	Wire interrupted	
				Signal from A038 ECU	Signal from compo-nent
B071 - Sensor, output temperature					
C11 (X1406)	**Signal** **Note:** Read sensor temperature from FENDIAS diagnosis.				
	-20°C	approx. 105 Kohms	4.5 VDC	4.9 VDC not loadable	0 VDC
	- 10°C	approx. 56 Kohms	4.3 VDC		
	0°C	approx. 31 Kohms	3.9 VDC		
	10°C	approx. 19 Kohms	3.5 VDC		
	15°C	approx. 14 Kohms	3.2 VDC		
	20°C	approx. 12 Kohms	3.0 VDC		
	30°C	approx. 8.0 Kohms	2.5 VDC		
	40°C	approx. 5.1 Kohms	2.0 VDC		
	50°C	approx. 3.4 Kohms	1.6 VDC		

NOTE: *see §12*

70 B073 sensor, solar (heat insolation)

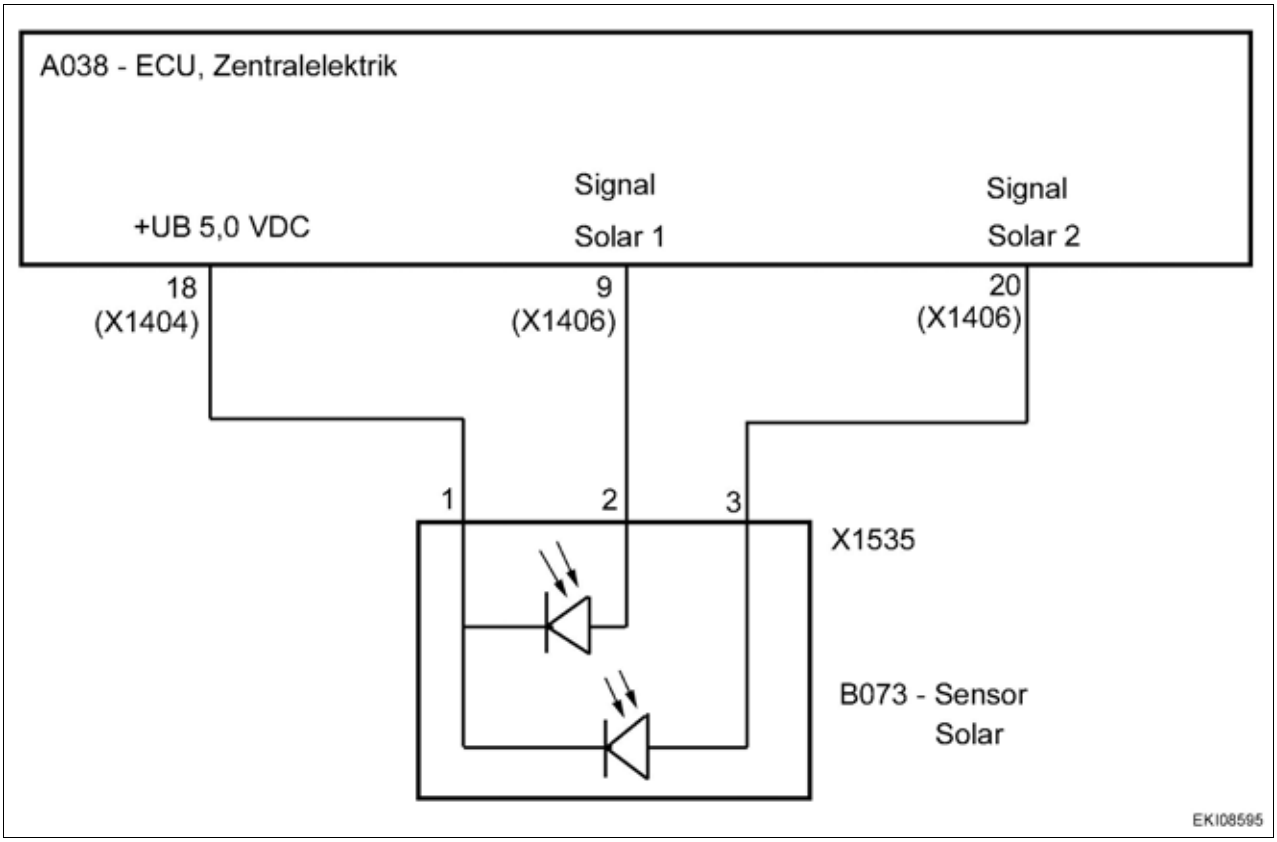


Fig. 265. I002387

Item	Designation	Note
A038 - ECU, central electrical system		
Pin 18 (X1404)	+ UB 5.0 VDC	
Pin 9 (X1406)	Signal, solar sensor 1	
Pin 20 (X1406)	Signal, solar sensor 2	
B073 - Sensor, solar (irradiation)		
X1535	Separation point at B073	
Pin 1	+ UB 5.0 VDC	
Pin 2	Signal, solar sensor 1	
Pin 3	Signal, solar sensor 2	

Measuring points and signal values

B073 - Sensor, solar (irradiation) X1535 separation point	
Pin	**Function**
1	+ UB 5.0 VDC
2	Signal, solar sensor 1
3	Signal, solar sensor 2



Fig. 266. I001083

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see §16*

Prerequisite for this measurement:

– Use the **vehicle earth** to **earth**

Pin	Pin description	Signal type/condition	Signal	Wire interrupted	
				Signal from A038 ECU	**Signal from compo-nent**
B073 - Sensor, solar (irradiation)					
A18 (X1404)	**+ supply**	Ignition OFF	0 VDC	0 VDC	0.4 VDC
		Ignition ON.	5.0 VDC	5.0 VDC	0.28 VDC
C9 (X1406) C20 (X1406)	**Signal Solar sensor 1** **Signal Solar sensor 2** **Note:** The signal from the solar sensor is dependent on: – Brightness – Heat insolation	The following values apply to both solar sensors:			
		Sensor in: – Darkened surroundings – Approx. 20°C	approx. 80 mVDC	0 VDC	0 VDC
		Sensor in: – Bright surroundings – Approx. 20°C	approx. 90 mVDC	0 VDC	approx. 2 VDC

NOTE: *Read signal values (W/mm2) from **B073** - Sensor, solar (irradiation) in the FENDIAS diagnostics program*
*The **B073** - Sensor, solar (irradiation) regulates the air conditioning characteristic according to the level of sunlight entering the cab.*
*In the event of **B073** - Sensor, solar (irradiation) failing, the **A038** - ECU, central electrical system regulates the automatic air conditioning system with the help of a preset characteristic (replacement value).*
Replacement value = 7 W/mm2

NOTE: *see §12*

71 B074 sensor, interior temperature

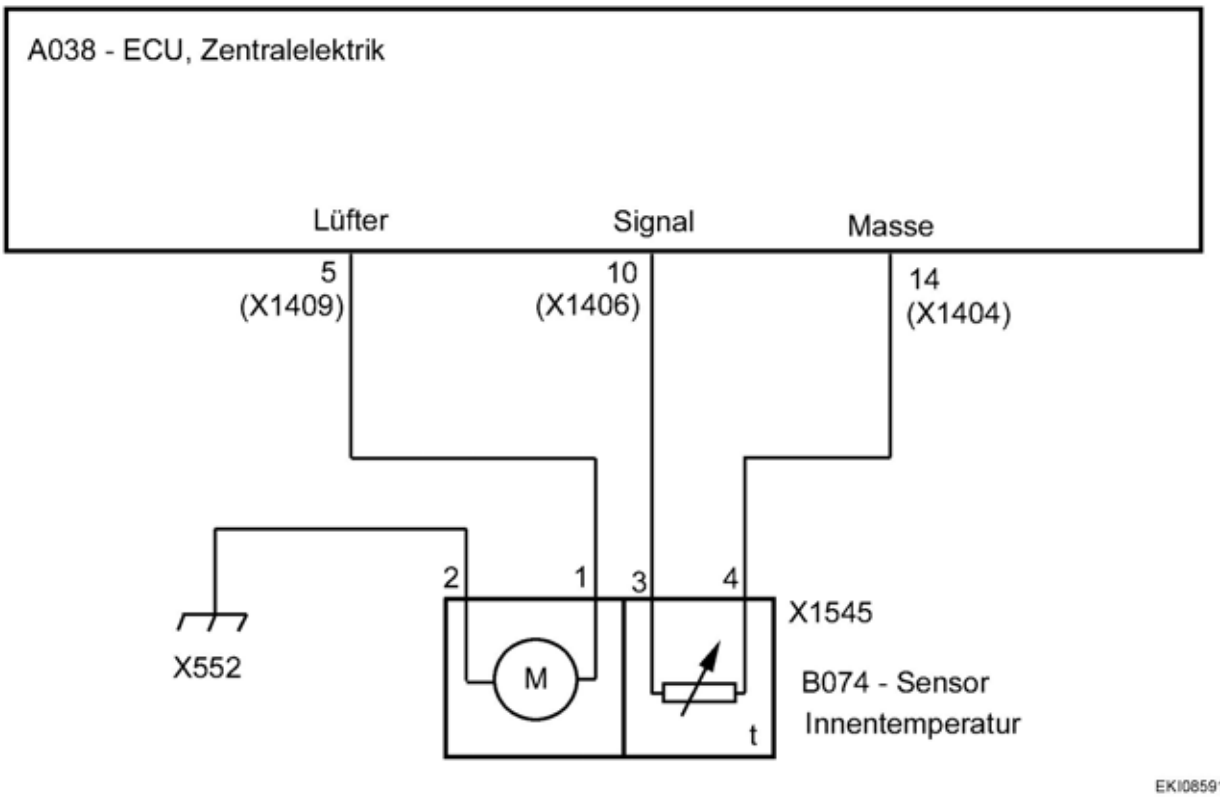


Fig. 267. I002382

Item	Designation	Note
A038 - ECU, central electrical system		
Pin 5 (X1409)	+supply for the fan	The fan prevents heat from accumulating around the temperature sensor.
Pin 10 (X1406)	Interior temperature signal	
Pin 14 (X1404)	Earth	
B074 - Sensor, internal temperature		
X1545	Separation point at B074	
Pin 1	+supply for the fan	
Pin 2	Earth	
Pin 3	Interior temperature signal	
Pin 4	Earth	
X552 earth pin		

Measuring points and signal values

B074 - Sensor, internal temperature X1545 separation point	
Pin	**Function**
1	+supply for the fan
2	Earth
3	Interior temperature signal
4	Earth

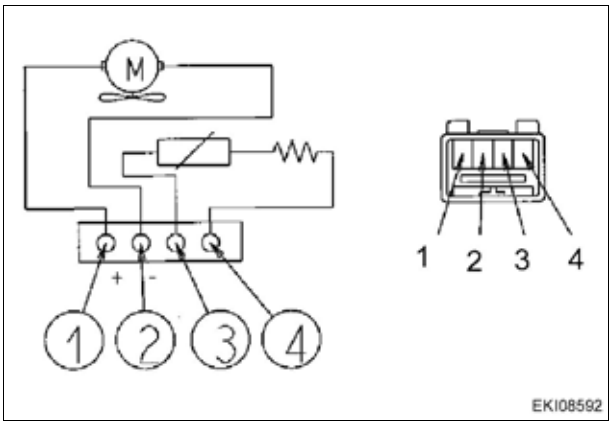


Fig. 268. I002383

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see §16*

Prerequisite for this measurement:

– Use the **vehicle earth** to **earth**

Pin	Pin description	Signal type/condition	Signal	Wire interrupted	
				Signal from A038 ECU	Signal from compo-nent
B074 - Sensor, internal temperature					
F5 (X1409)	**+ supply**	Ignition OFF, Fan OFF	0 VDC	0 VDC	0 VDC
		Ignition ON, Fan ON	approx. 12 VDC	2.4 VDC	0 VDC
C10 (X1406)	**Signal**				
	0°C	Approx 7.0 Kohms			
	10 °C	Approx 4.5 Kohms			
	20 °C	Approx 3.0 Kohms			
	25 °C	Approx 2.2 Kohms			
	30 °C	Approx 1.8 Kohms			
	40 °C	Approx 1.5 Kohms			
	50 °C	Approx 1.0 Kohms			
	60 °C	Approx 0.8 Kohms			

NOTE: *see §12*

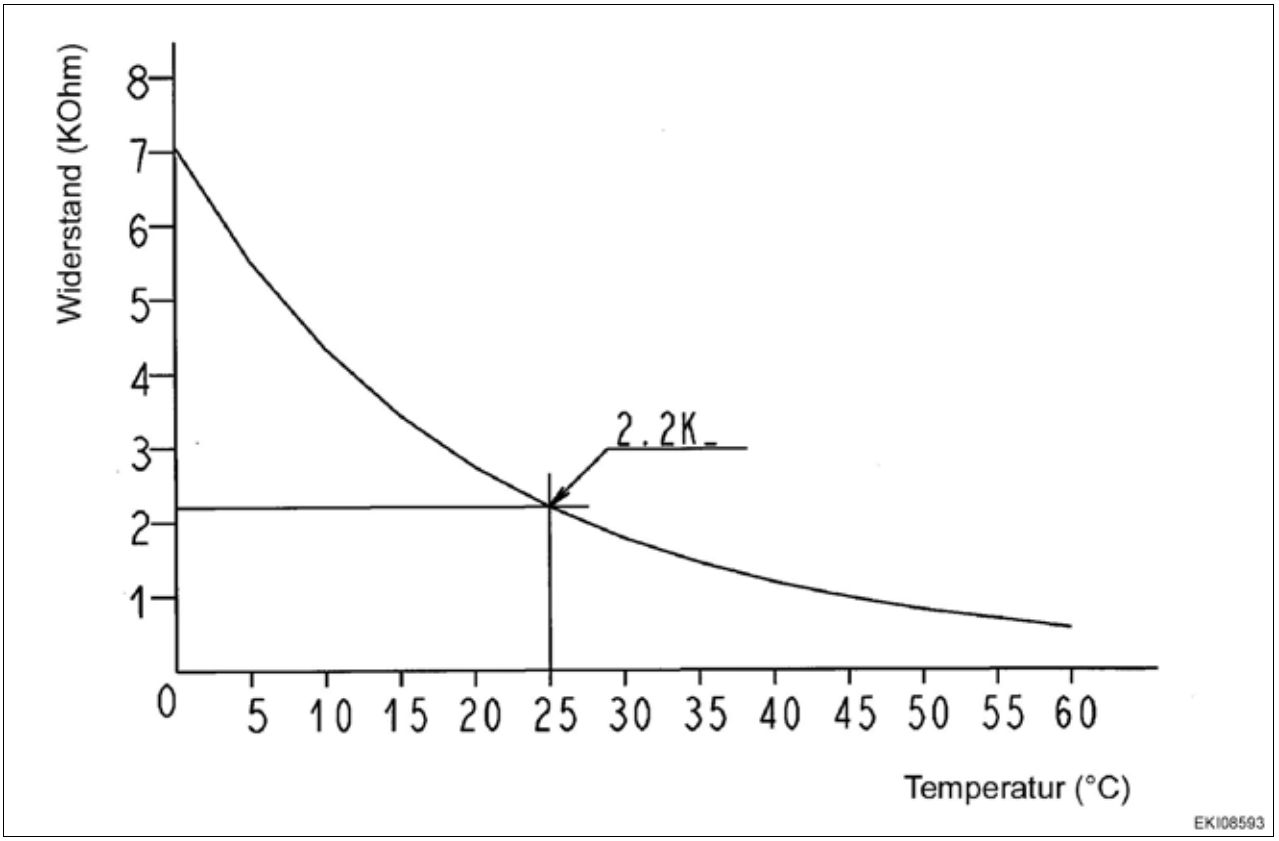


Fig. 269. I002384

72 B076 exterior temperature sensor

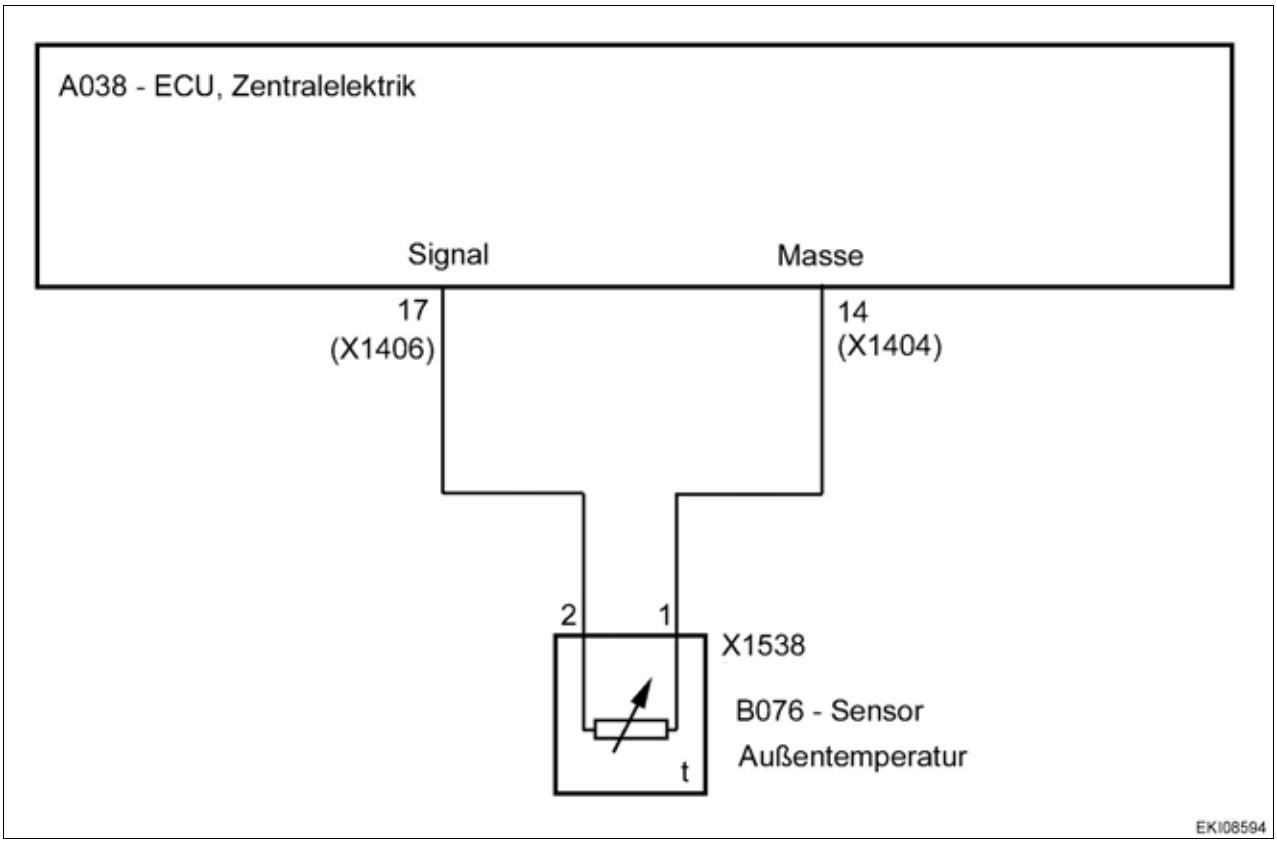


Fig. 270. I002386

Item	Designation	Note
A038 - ECU, central electrical system		
Pin 17 (X1406)	Signal	
Pin 14 (X1404)	Earth	
B076 - Sensor, external temperature		
X1538	Separation point at B076	
Pin 1	Earth	
Pin 2	Signal	

Measuring points and signal values

B076 - Sensor, external temperature X1538 separation point	
Pin	**Function**
1	Earth
2	Signal



Fig. 271. I001246

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see §16*

Prerequisite for this measurement:

– Use the **vehicle earth** to **earth**

Pin	Pin description	Signal type/condition	Signal	Wire interrupted	
				Signal from A038 ECU	Signal from compo-nent
B076 - Sensor, external temperature **(on front of air conditioning condenser)**					
C17 (X1406)	**Signal**				
	-20°C	120 Kohms	4.6 VDC	4.8 VDC	0 VDC
	- 10°C	60 Kohms	4.3 VDC		
	0°C	32 Kohms	4.0 VDC		
	10°C	20 Kohms	3.6 VDC		
	20°C	13 Kohms	3.1 VDC		
	30°C	8.0 Kohms	2.6 VDC		
	40°C	5.0 Kohms	2.0 VDC		
	50°C	3.5 Kohms	1.6 VDC		

NOTE: *see §12*

73 B077 control, engine fan (speed sensor/magnetic clutch)

NOTE: *see §2*

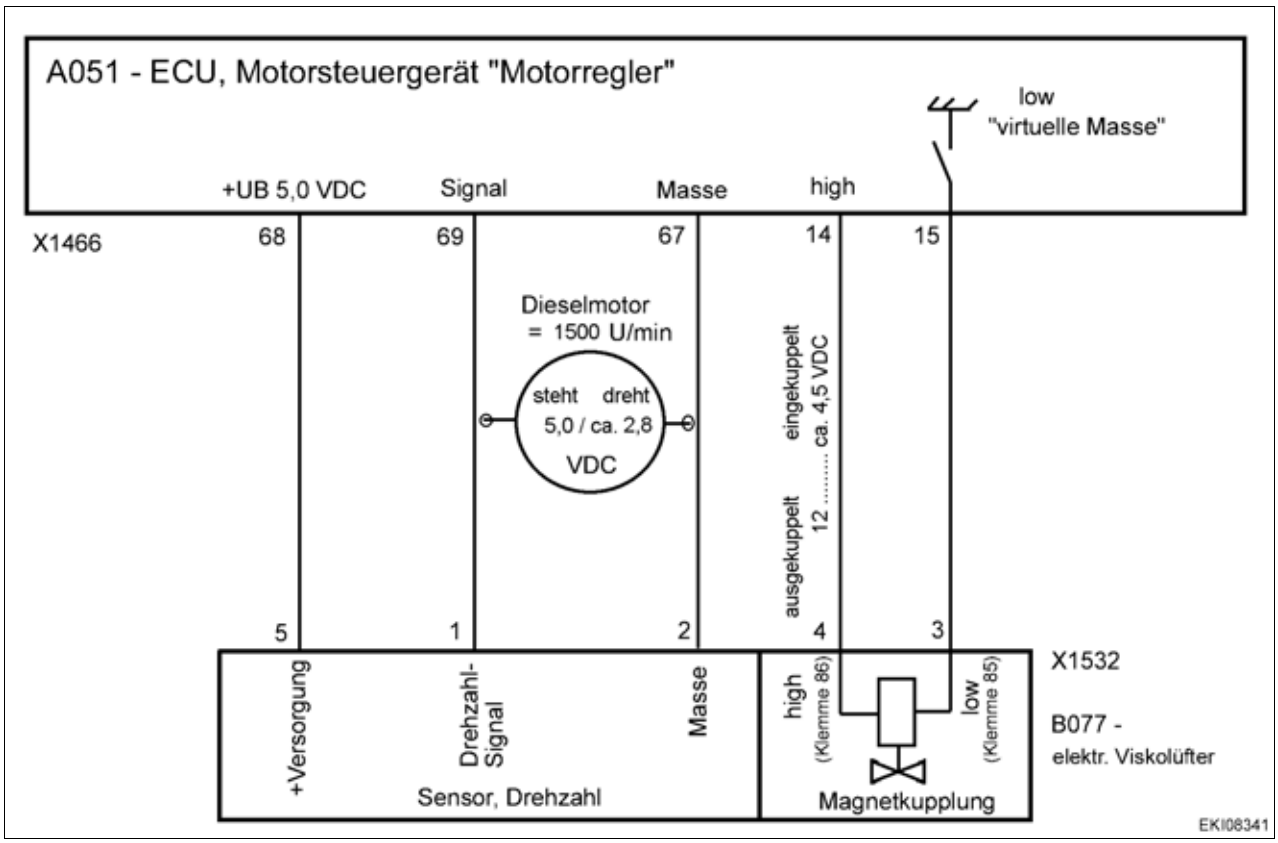


Fig. 272. I002035

Item	Designation	Note
A051 - ECU, engine control unit (EDC 7).		
X1466	Separation point on A051 engine control unit	
Pin 14	Magnetic clutch (high)	
Pin 15	Magnetic clutch (low) "virtual earth" (approx. 3.5 VDC)	
Pin 67	Speed sensor (earth)	
Pin 68	Speed sensor (+UB 5.0 VDC)	Switch on ignition.
Pin 69	Speed sensor (signal)	
B077 - Engine fan (speed sensor/magnetic clutch)		
X1532	Separation point on B077 engine fan control	
Pin 1	Speed sensor (signal)	
Pin 2	Speed sensor (earth)	
Pin 3	Magnetic clutch (low) "virtual earth" (approx. 3.5 VDC)	
Pin 4	Magnetic clutch (high)	
Pin 5	Speed sensor (+UB 5.0 VDC)	Switch on ignition.

Measuring points and signal values

Measuring points on the B077 - Engine fan (speed sensor/magnetic clutch)	
Pin	**Function**
1 (yellow cable)	Speed sensor (signal)
2 (pink/black cable)	Speed sensor (earth)
3 (blue cable)	Magnetic clutch (low) "virtual earth"
4 (red cable)	Magnetic clutch (high)
5 (green cable)	Speed sensor (+supply)

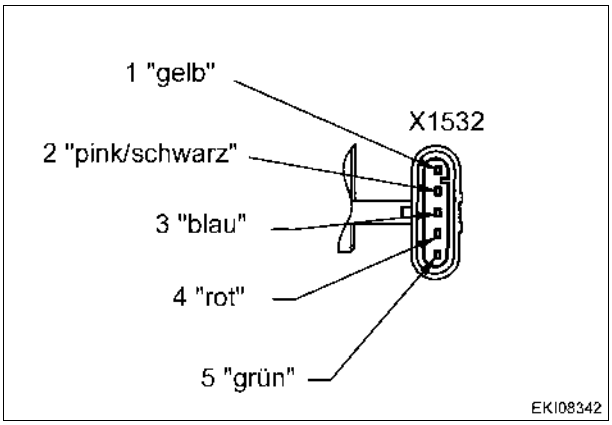


Fig. 273. I001542

Measuring point on the A051 - ECU, engine control unit (EDC 7). (X1466 separation point)	
Function	**Pin**
Magnetic clutch (high)	14
Magnetic clutch (low) "virtual earth" (approx. 3.5 VDC)	15
Speed sensor (earth)	67
Speed sensor (+UB 5.0 VDC)	68
Speed sensor (signal)	69

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.202 adapter cable to the **A051** - ECU, engine control unit (EDC 7). and measure the pins.*
Switch on ignition.
All readings +/- 10%.
see §37

Test	Pin	Specified value	condition	Possible cause of fault
Speed sensor				
+ supply	68	5.0 VDC		
Earth	67			
Signal	69	Approx. 5.0 VDC	Engine OFF, Viscous fan stationary	
		Approx. 2.8 VDC (regardless of fan speed)	Engine is running	
Earth	67			
Magnetic clutch --- earth at pin 5 (on X1466)				
Actuation (high)	14	Approx. 14 VDC	Viscous fan in idle	
		Approx. 4.5 VDC	Viscous fan engages	

NOTE: *see §36*

Possible cause of fault

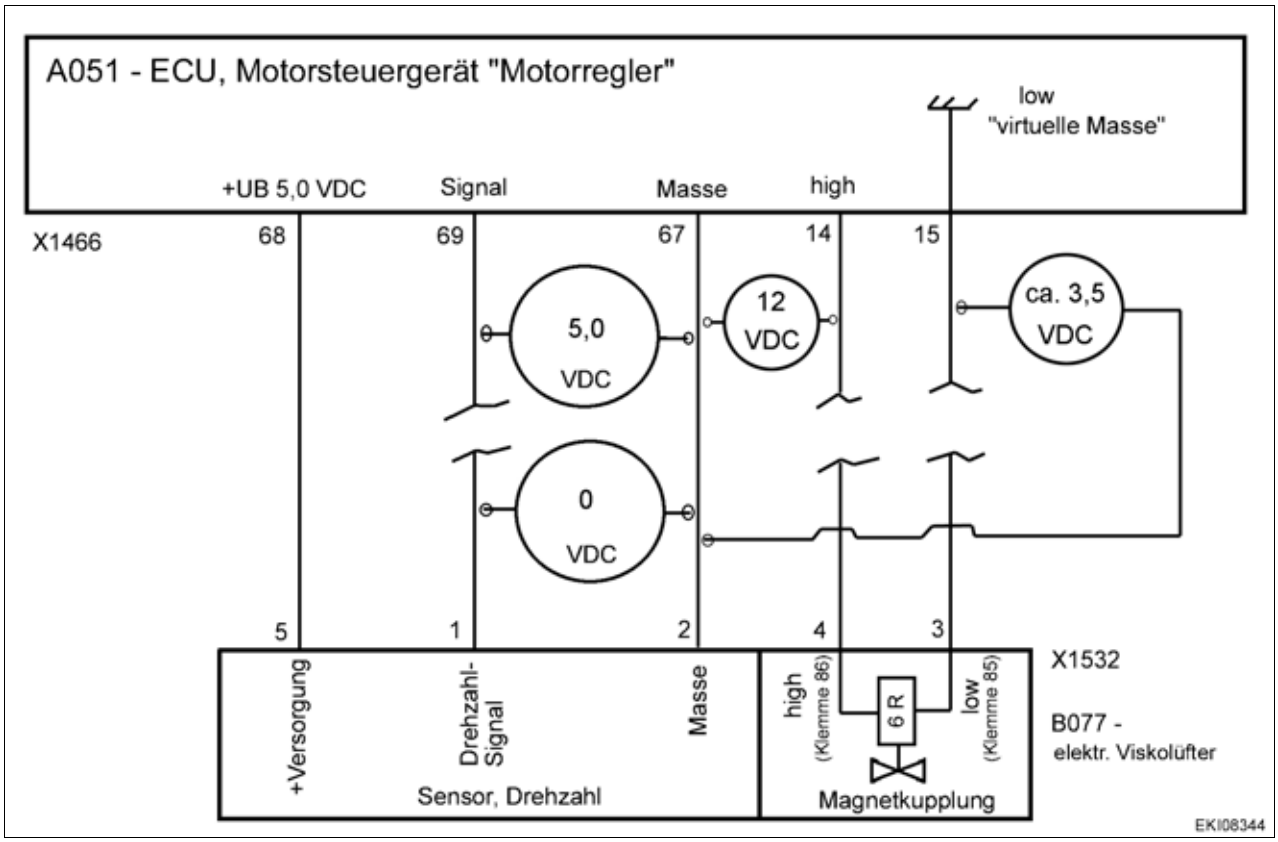


Fig. 274. I002040

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74 B081 steering wheel sensor (360°)

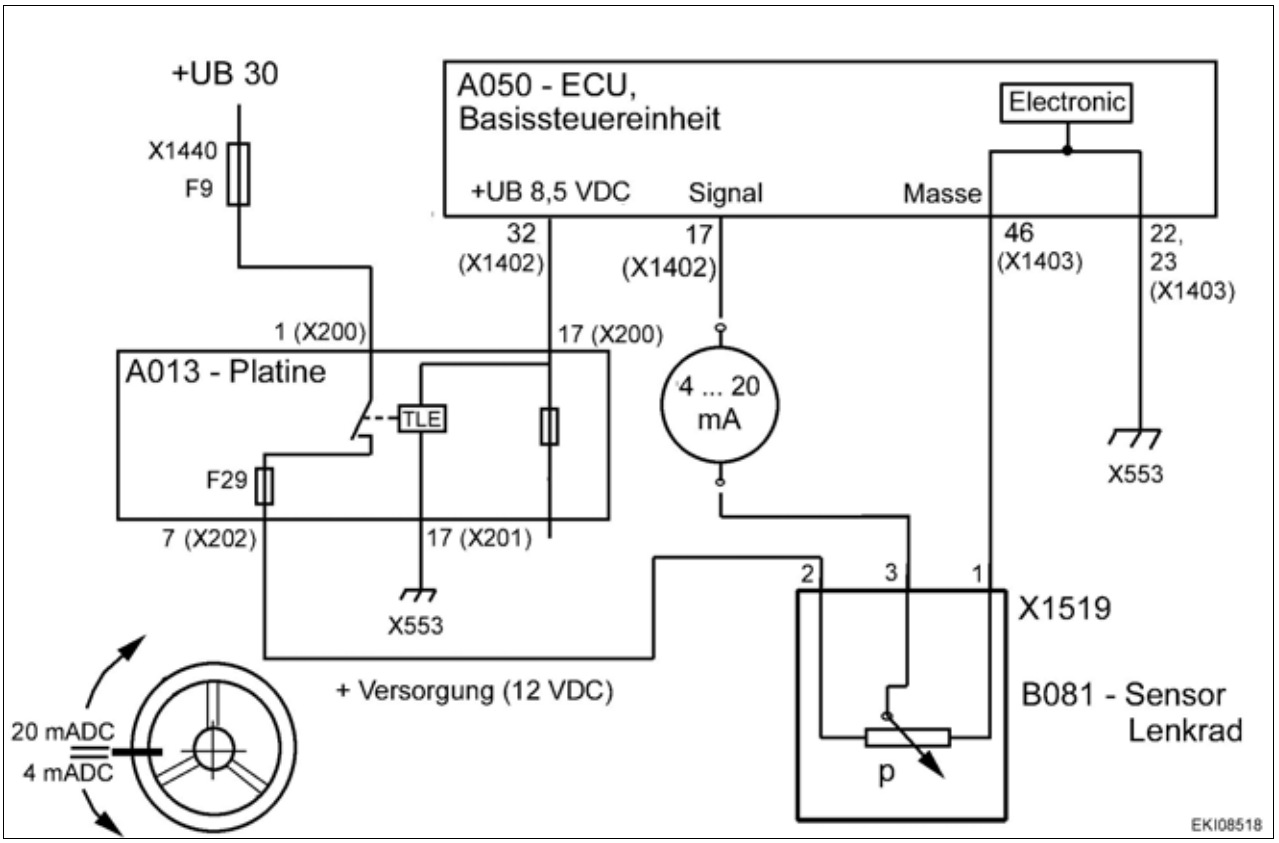


Fig. 275. I002335

Item	Designation	Note
A013 - PCB, microfuses **(microfuse no. 29)**		
X200	Separation point on **A013** - PCB, microfuses	
X201	Separation point on **A013** - PCB, microfuses	
X202	Separation point on **A013** - PCB, microfuses	
Pin 1 (X200)	+supply for the **A013** - PCB, microfuses (12 VDC)	
Pin 17 (X200)	+ supply for the **A013** - PCB, microfuses (8.5 VDC)	Switch on ignition.
Pin 17 (X201)	Earth	
Pin 7 (X202)	+supply for the B081 steering wheel sensor (12 VDC)	Switch on ignition.
A050 - ECU, basic control unit		
X1402	Separation point on the A050 ECU, basic control unit	
X1403	Separation point on the A050 ECU, basic control unit	
Pin 32 (X1402)	+ supply for the **A013** - PCB, microfuses (8.5 VDC)	Switch on ignition.
Pin 17 (X1402)	Signal	
Pin 46 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
B081 - Steering wheel sensor (360°)		
X1519	Separation point on B081 sensor	
Pin 1	Earth	
Pin 2	+ supply (12 VDC)	Switch on ignition.

Item	Designation	Note
Pin 3	Signal	
X553 earth pin		
X1440 fuse holder		

Measuring points and signal values

Measuring points on the B081 - Steering wheel sensor (360°)	
Pin	**Function**
1	Earth
2	+ supply
3	Signal



Fig. 276. I006663

Measuring point on A050 - ECU, basic control unit (X1402 + X1403 separation points)	
Function	**Pin**
Signal	17 (X1402)
Sensor system earth	46 (X1403)

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.201 adapter cable to the **A050** - ECU, basic control unit and measure the pins.* *see §34*

Draw out bridge at pin 17 (X1402) on the adapter box and connect ammeter
Turn the steering wheel slowly until the 4/20 mADC switchover point is reached.
This is the reference point for the reading.
Turn steering wheel slowly to the left (360°) = 4 to 20 mADC (power consumption increases)
Turn steering wheel slowly to the right (360°) = 20 to 4 mADC (power consumption decreases)

The A050 ECU, basic control unit uses the current difference to determine the rotation angle and the rotation direction of the steering wheel.

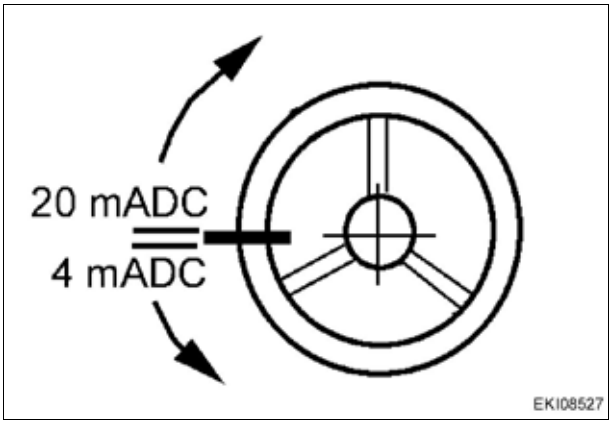


Fig. 277. I002337

NOTE: *Switch on ignition.*
Engine is running
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	2	12 VDC		Microfuse (no. 29) in A013 or within wiring set
Earth	1			

Test	Pin	Specified value	condition	Possible cause of fault
Signal	3	4 to 20 mADC (360° rotation angle)	Turn the steering wheel slowly to the left (power consumption increases)	
		20 to 4 mADC (360° rotation angle)	Turn the steering wheel slowly to the right (power consumption decreases)	
Earth	1			

NOTE: *see §33*
see §152

Possible cause of fault

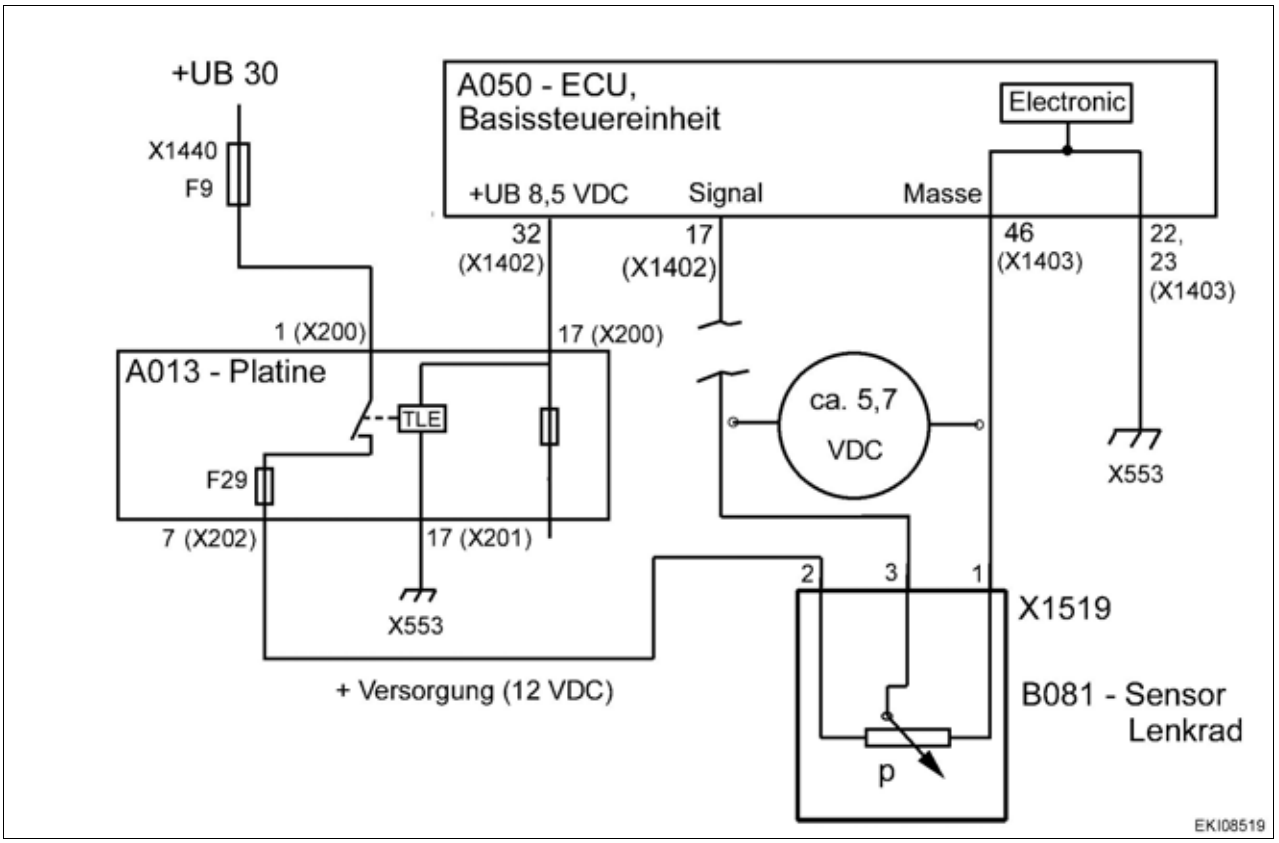


Fig. 278. I002338

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75 B083 immobiliser control unit

B083 immobiliser control unit
X1494 separation point at B083

On left of steering column.

Remove left panel.



Fig. 279. I001999

U001 aerial

On right of steering column, positioned at the ignition switch.

Remove right panel.

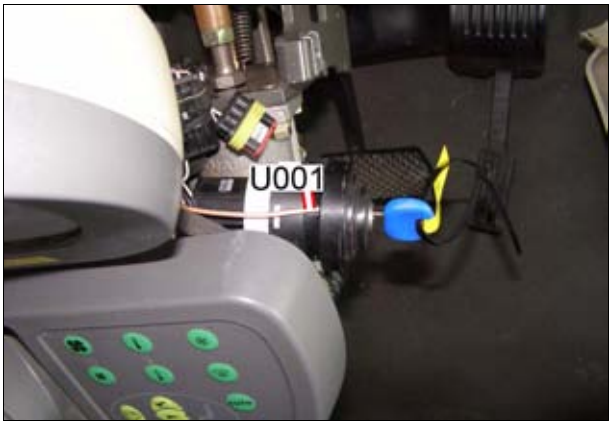


Fig. 280. I002006

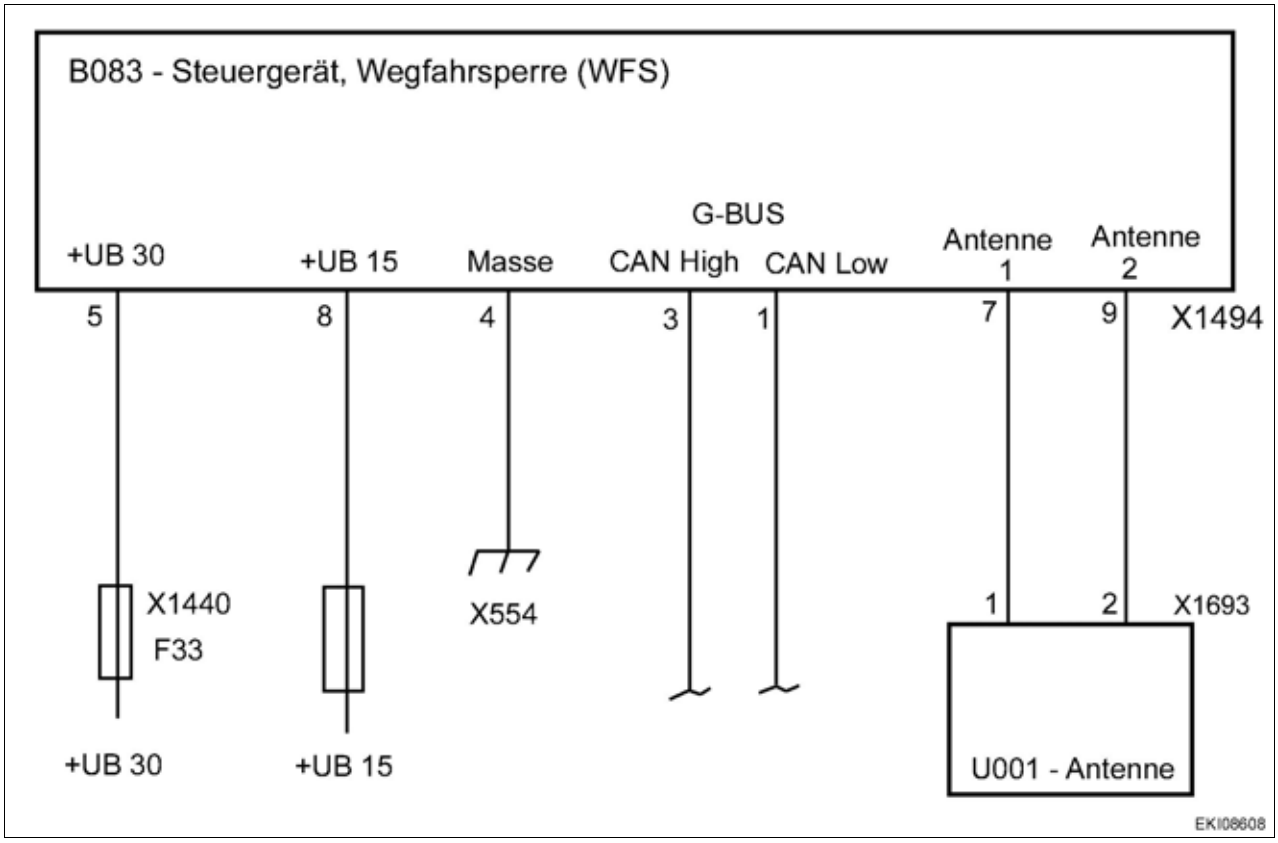


Fig. 281. I002413

Item	Designation	Note
B083 immobiliser control unit		
X1494	Separation point on B083	
Pin 5	+ UB 30	
Pin 8	+ UB 15	Ignition ON
Pin 4	Earth	
Pin 3	G BUS (CAN high)	
Pin 1	G BUS (CAN low)	
Pin 7	Aerial	
Pin 9	Aerial	
U001 aerial		
X1693	Separation point at U001	
Pin 1	Aerial	
Pin 2	Aerial	
X554 earth pin		

Starting the tractor with the ignition key

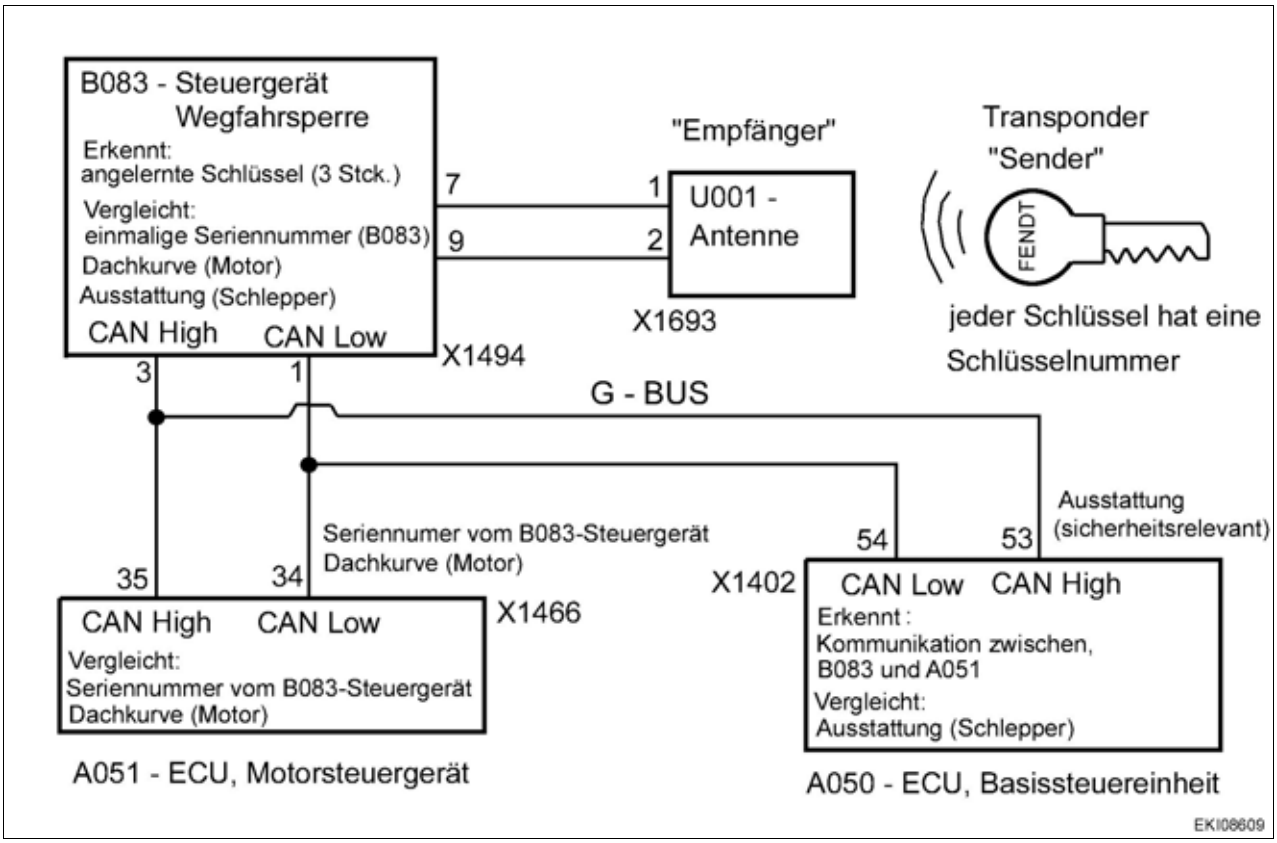


Fig. 282. I002411

Each ignition key has a unique key number.
The key number is transmitted to the B083 control unit "Receiver" via a transponder "Transmitter".
If the B083 control unit detects a key, the connection from the B083 immobiliser control unit to the A051 ECU, engine control unit and the A050 ECU, basic control unit is established.

The **B083 immobiliser control unit** and the **A051 ECU, engine control unit** compare their data (serial number, envelope curve (performance curve) etc.).

The **B083 immobiliser control unit** and the **A050 ECU, basic control unit** compare their data (tractor equipment (1-circuit or 2-circuit brake), communication on the transmission BUS etc.).

If all comparison points are OK, the starting quantity is released at the A051 ECU, engine control unit, and the tractor starts.

When components are replaced (B083 immobiliser control unit and/or A051 ECU, engine control unit), **the B083 immobiliser control unit and the A051 ECU, engine control unit must be introduced again.**

NOTE: *See also:*
Chapter 9015 Reg. F – Teaching the B083 immobiliser control unit and/or A051 ECU, engine control unit (required when component is replaced).

Diagram: teaching the ignition key

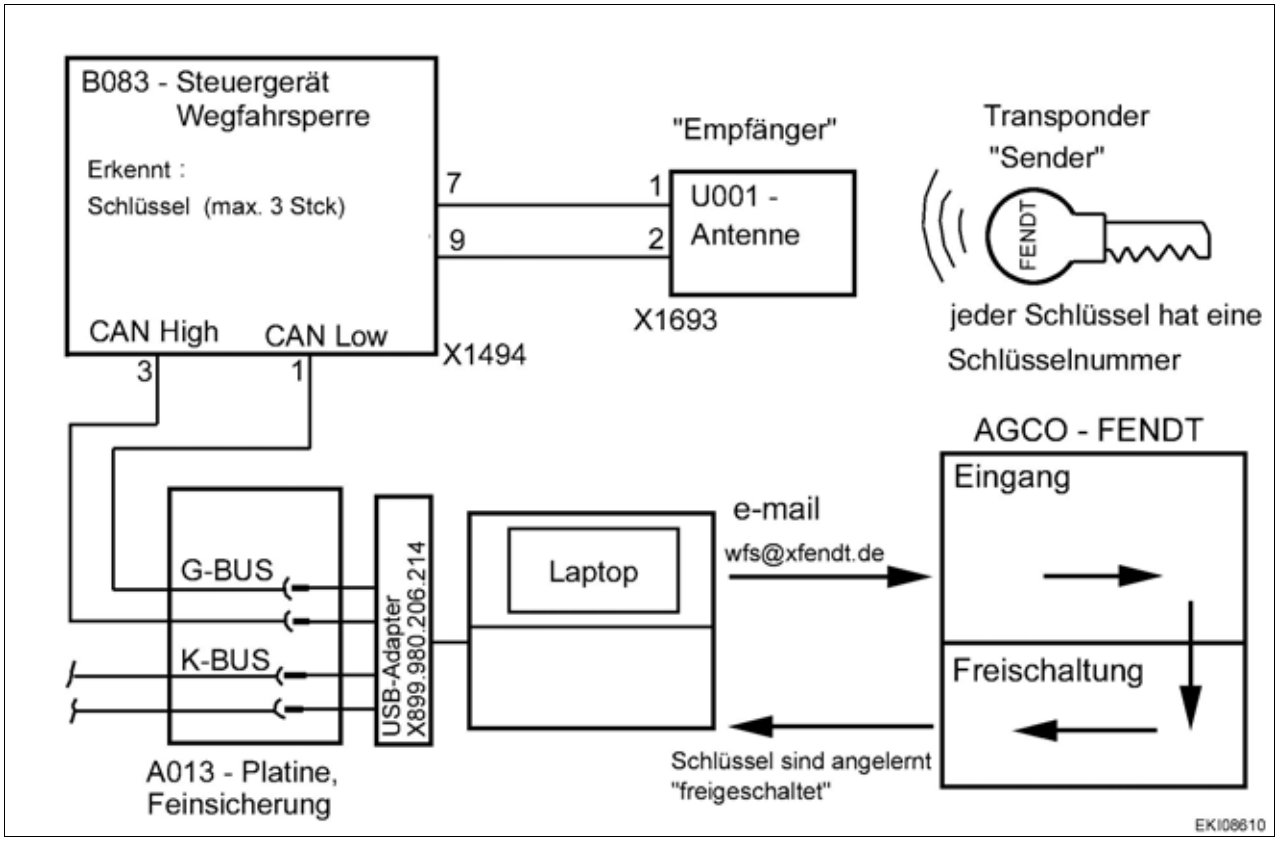


Fig. 283. I002412

The B083 control unit must learn to recognise **its** ignition key.
The B083 control unit is able to recognise up to 3 keys.

When the B083 control unit is replaced, the new unit must again be taught to recognise the ignition keys (up to 3).

The teaching process (main items):

- Connect a laptop with EOL 7.58 or higher to the Transmission BUS and the Control BUS
- Read in ignition keys
- Send read-in ignition keys (file) to AGCO-FENDT via e-mail (wfs@xfendt.de)
- AGCO-FENDT releases the read-in ignition keys and sends the released ignition keys (file) back to the workshop
- The workshop reads the released ignition keys (file) into the B083 control unit (EOL 7.58 or higher).

NOTE: *See also:*
Chapter 9015 Reg. F – Teaching the ignition keys

76 B084 sensor, hydraulic oil level

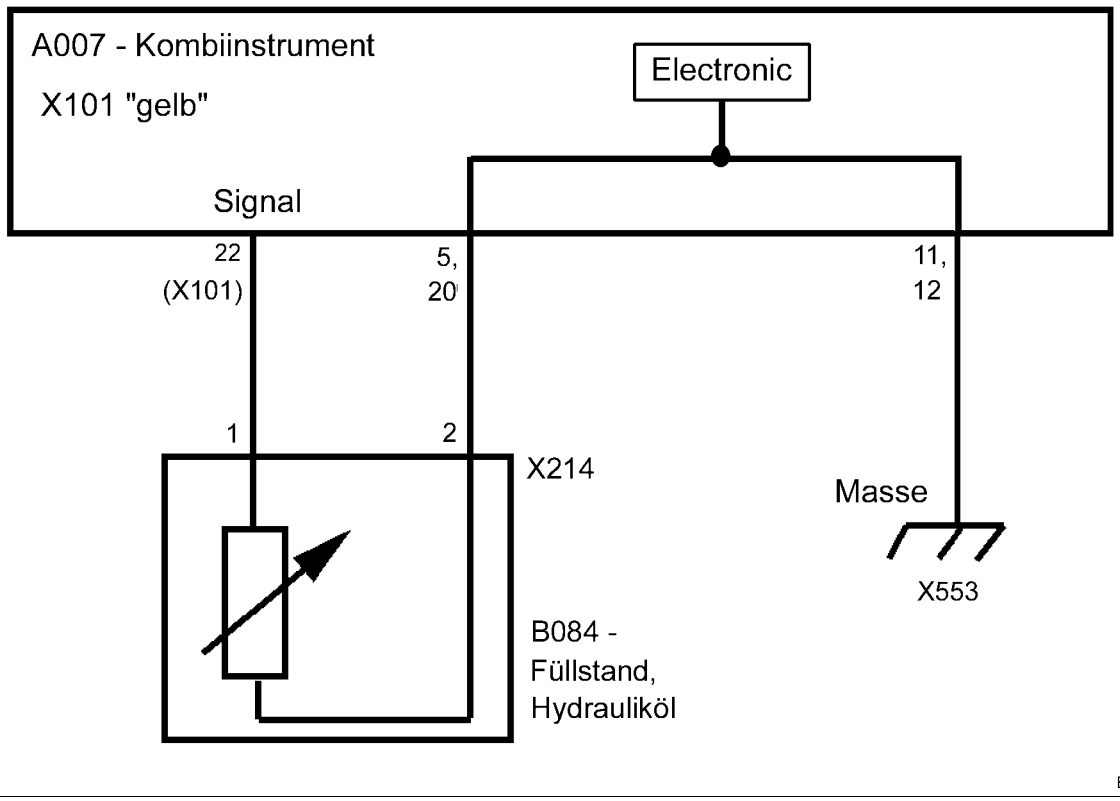


Fig. 284. I002389

Item	Designation	Note
A007 - Instrument panel		
X101	"Yellow" separation point on A007 instrument panel	
Pins 5 and 20 (X101 "yellow")	Sensor system earth	
Pins 11 and 12 (X101 "yellow")	Electronics earth	
Pin 22 (X101 "yellow")	Signal	
B084 - Sensor, hydraulic oil level		
X214	Separation point at B084 hydraulic oil level	
Pin 1	Signal	
Pin 2	Earth	
X553 earth pin		

Measuring points and signal values

Measuring points on the B084 - Sensor, hydraulic oil level	
Pin	**Function**
1	Signal
2	Earth

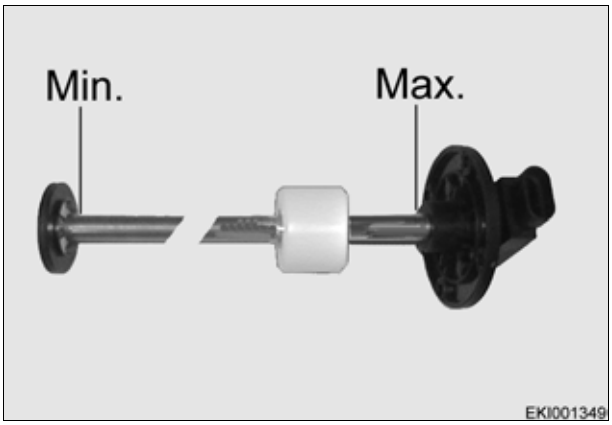


Fig. 285. I001509

Checking the B084 - Sensor, hydraulic oil level
Remove B084 level sensor.
Connect X899.980.246.204 adapter cable to the B084 level sensor.
Move float (arrow) by hand.

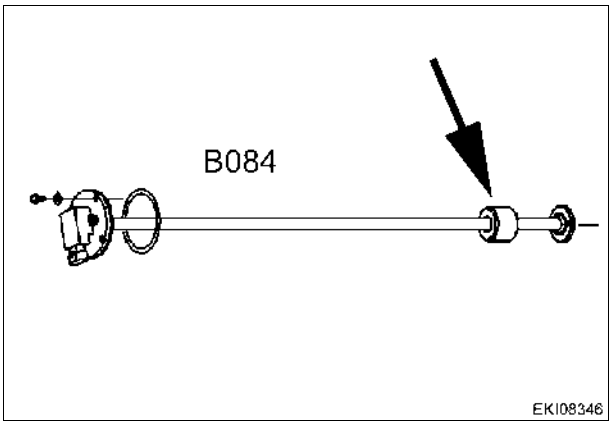


Fig. 286. I001544

Using the X899.980.208.204 adapter cable, connect the X899.980.208.100 e-adapter box to the A007 - Instrument panel	
Pin at separation point	Pin on the adapter box (68-pin)
X101 separation point "yellow" (1 to 26)	1 to 26
X100 separation point "blue" (1 to 26)	31 to 56

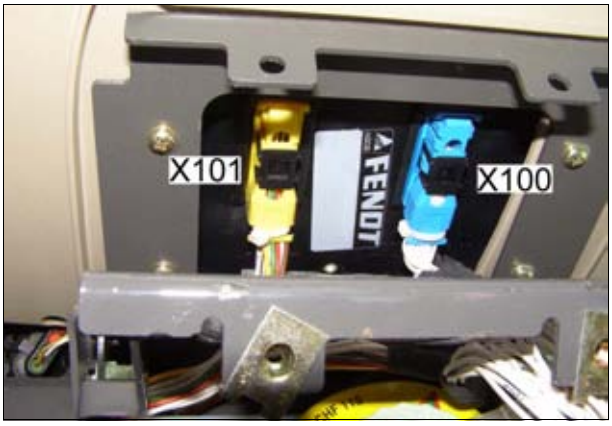


Fig. 287. I001226

NOTE: *see §1*

Checking the hydraulic oil display on the A007 - Instrument panel

Connect the X899.980.246.204 adapter cable to the X214 separation point (connection to B084 remains open).
Connect the X 899.980.224 resistance decade.
Switch on ignition.
Select corresponding resistance (see table) and compare with display on the **A007** - Instrument panel.

NOTE: *Allow preconditioning time of approx. 1 minute.*

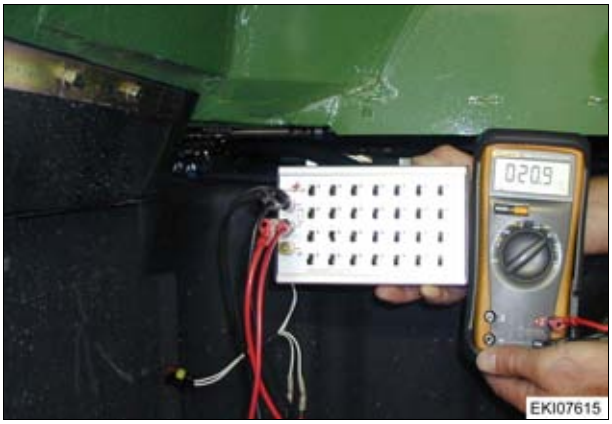


Fig. 288. I001514

B084 hydraulic oil level (Note: all values are approximate)				
Display on A007	**Signal**	**Resistance**	**Litres**	**Note**
1 bar flashing "EMPTY"	0.2 VDC	20 ohms	0 l	
1 bar	0.6 VDC	60 ohms	19 l	
2 bars	0.95 VDC	100 ohms	26.5 l	Valves are locked - FC:0A.1.D9
3 bars	1.35 VDC	140 ohms	36 l	Advance warning* - FC: 0A.1.D8
4 bars	1.70 VDC	180 ohms	46 l	
5 bars	2.10 VDC	220 ohms	55 l	
6 bars	2.45 VDC	260 ohms	64 l	
7 bars	2.80 VDC	300 ohms	74 l	
8 bars	3.20 VDC	340 ohms	83 l	
9 bars	3.60 VDC	380 ohms	94 l	
10 bars	4.00 VDC	420 ohms	103 l	
11 bars	4.34 VDC	460 ohms	109 l	
12 bars	4.70 VDC	500 ohms	113 l	
12 bars "FULL"	5.00 VDC	500 ohms	115 l	

*Advance warning: A warning message is displayed and the valves are limited to 10 l/min.

77 B085 sensor, camshaft speed

NOTE: *see §6*

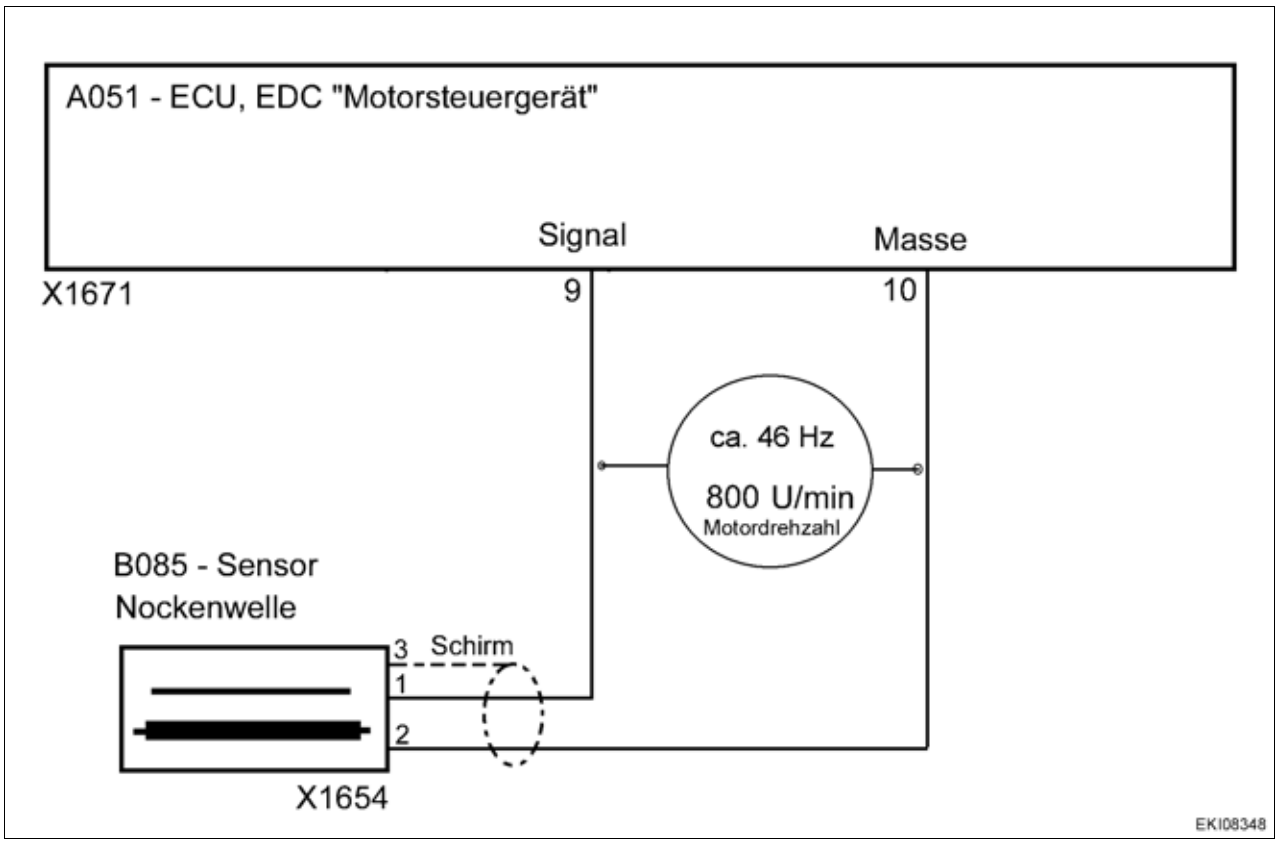


Fig. 289. I002042

Item	Designation	Note
A051 - ECU, engine control unit (EDC 7).		
X1671	Separation point on the A051 ECU, engine control unit	
Pin 9	Signal	
Pin 10	Earth	
B085 - Camshaft speed sensor		
X1654	Separation point on B085 sensor	
Pin 1	Signal	
Pin 2	Earth	
Pin 3	Shield	

Measuring points and signal values

Measuring points on the B085 - Camshaft speed sensor X1654 separation point	
Pin	**Function**
1	Signal
2	Earth
3	Shielding against interference



Fig. 290. I001548

NOTE: *Connect adapter cable (locally made) directly to the **B085** - Camshaft speed sensor.*
All readings +/- 10%

Measuring the internal resistance

Test	Pin	Specified value	condition	Possible cause of fault
Signal	1	Approx. 3.6 Kohms	Ignition "OFF". plug adapter cable (in-house production) into B085 sensor (X1654 separation point) only.	Reading infinity: component fault.
Earth	2			

Measuring induction voltage and frequency

B085 - Camshaft speed sensor Note: The voltage values vary according to the ambient temperature. The most important factor for measurement purposes is the ratio between the engine speed and the voltage. (i.e. double the engine speed -- double the voltage)		
Engine revolutions	**Induced voltage (alternating current VAC)**	**Frequency**
0 rpm (stationary)	0 VDC	0 Hz
800 rpm (idling)	Approx. 1.85 VAC	Approx. 46 Hz
1000 rpm	Approx. 2.26 VAC	Approx. 60 Hz
1200 rpm	Approx. 2.62 VAC	Approx. 70 Hz
1400 rpm	Approx. 2.93 VAC	Approx. 80 HZ
1600 rpm	Approx. 3.23 VAC	Approx. 93 Hz
1800 rpm	Approx. 3.51 VAC	Approx. 105 Hz
2000 rpm	Approx. 3.77 VAC	Approx. 117 Hz
2200 rpm	Approx. 4.01 VAC	Approx. 129 Hz
2300 rpm (no-load speed)	Approx. 4.18 VAC	Approx. 137 Hz

Measuring point on the A051 - ECU, engine control unit (EDC 7). (X1671 separation point)	
Function	**Pin**
Signal	9
Earth	10

NOTE: *see §36*
see §37
see §6

Checking permanent magnet of the inductive sensor

Checking permanent magnet of the inductive sensor
Hold inductive sensor against a metal plate.
The inductive sensor must "stick" to the metal plate.

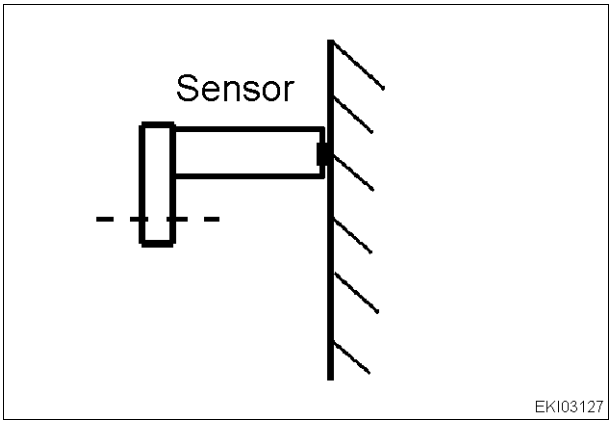


Fig. 291. I001546

Possible cause of fault

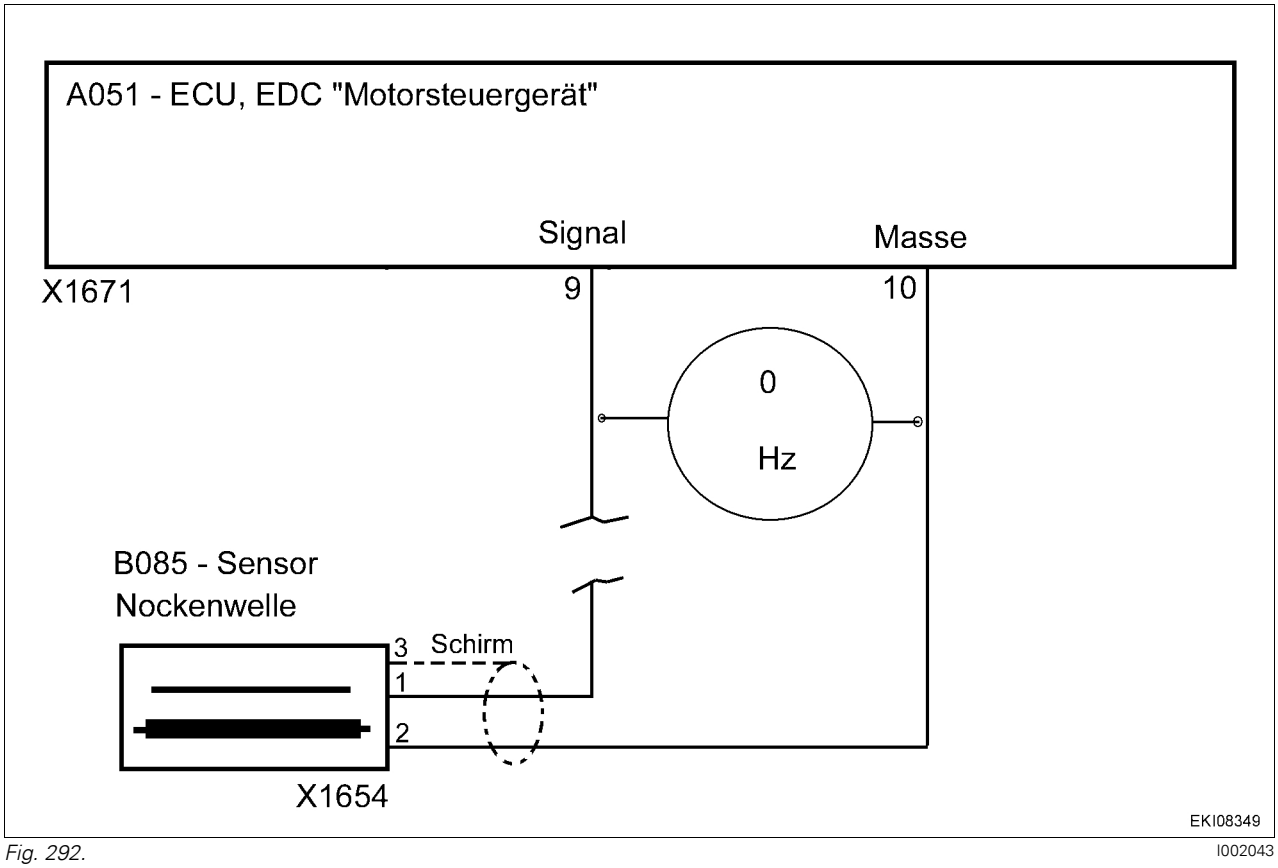


Fig. 292. I002043

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Oscilloscope image of **B085** - Camshaft speed sensor

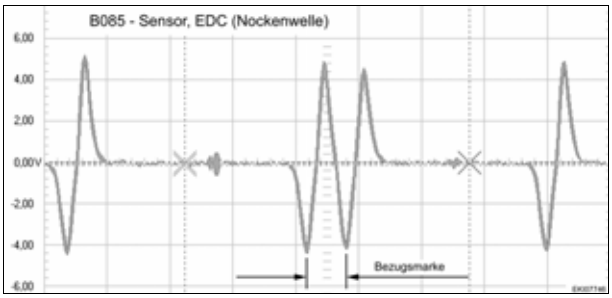


Fig. 293. I001549

Calculation of crankshaft revs (engine speed) on the basis of the oscilloscope display

NW	Camshaft gear
delta t	Time between voltage peaks

Using the voltage peaks, the **A051** - ECU, engine control unit (EDC 7). calculates the engine speed

Clearance between sensor and camshaft gear: 1.0 to 2.0 mm

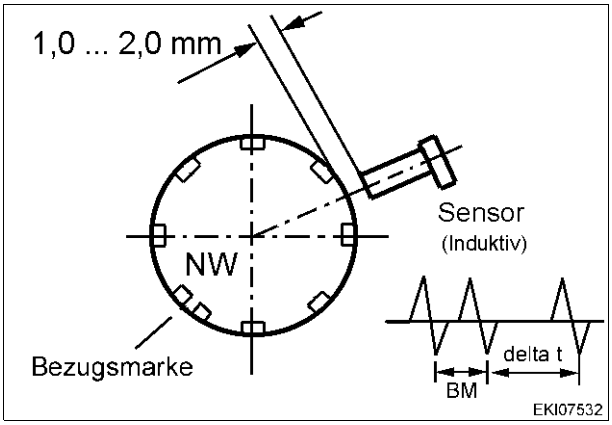


Fig. 294. I001550

Detection of current engine position

The B085 - Camshaft speed sensor is necessary for the synchronisation of the injection events.
It delivers only 1 signal per working cycle and must be aligned with the reference mark (of the 1st cylinder) on the crankshaft.
See also: B088 EDC (crankshaft) sensor.

When the camshaft is rotating, an AC voltage (VAC) is induced in the **B085** - Camshaft speed sensor by the mark on the camshaft gear.
The **A051** - ECU, engine control unit (EDC 7). calculates the camshaft speed from the voltage frequency.
The double cog (reference mark) causes a change in the frequency.
The double cog (reference mark) is used to determine the current position of the camshaft and appears once per working cycle.

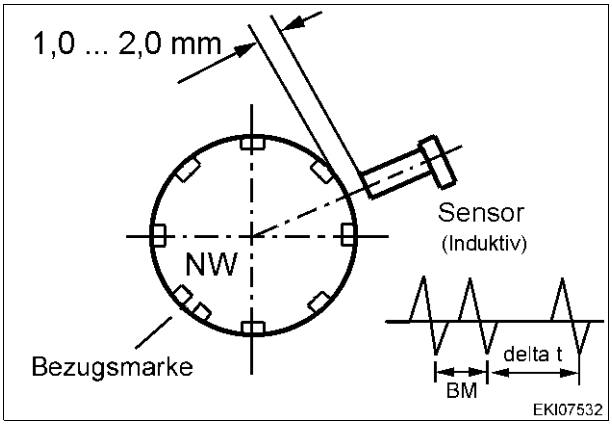


Fig. 295. I001551

NOTE: ***Working cycle (4-stroke engine)***
2 crankshaft revolutions
1 camshaft revolution

78 B086 rail pressure sensor

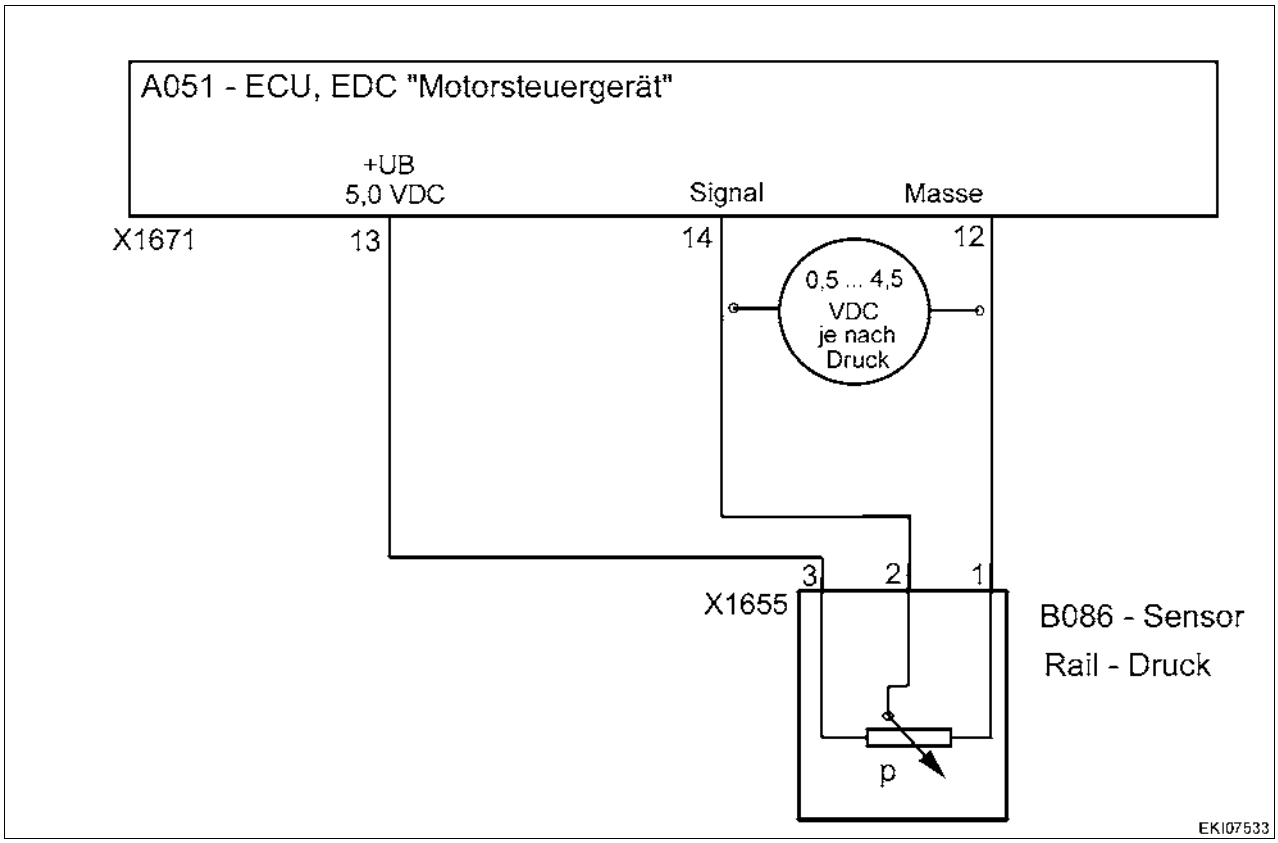


Fig. 296. I001555

Item	Designation	Note
A051 - ECU, engine control unit (EDC 7).		
X1671	Separation point on **A051** - ECU, engine control unit (EDC 7).	
Pin 12	B086 sensor earth	
Pin 13	+supply for B086 sensor (+UB 5.0 VDC)	
Pin 14	Signal	
B086 - Rail pressure sensor		
X1655	Separation point on B086 sensor	
Pin 1	Earth	
Pin 2	Signal	
Pin 3	+ supply (+UB 5.0 VDC)	

Measuring points and signal values

Measuring points on the B086 - Rail pressure sensor X1655 separation point	
Pin	**Function**
1	Earth
2	Signal
3	+ supply



Fig. 297. I001086

NOTE: *Connect the X899.980.259.105 adapter cable directly to the **B086** - Rail pressure sensor.*
All readings +/- 10%

Measuring the internal resistance

Test	Pin	Specified value	condition	Possible cause of fault
Signal	2	Infinite resistance	Switch off ignition.	
Earth	1			

Measure +power supply

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	3	5.0 VDC	Switch on ignition.	
Earth	1			

Fuel pressure in the high-pressure accumulator "rail pressure" (diesel engine without load)

Note: diesel engine cold and without load.		
Engine speed	**Fuel pressure in the high-pressure accumulator (rail pressure)**	**Signal voltage**
Ignition ON, Engine off	0 bar	Approx. 0.5 VDC
800 rpm	400 bar	Approx. 1.37 VDC
1200 rpm	530 bar	Approx. 1.65 VDC
1600 rpm	700 bar	Approx. 2.02 VDC
2000 rpm	750 bar	Approx. 2.13 VDC
2200 rpm	800 bar	Approx. 2.24 VDC
2300 rpm	820 bar	Approx. 2.29 VDC

Fuel pressure in the high-pressure accumulator "rail pressure" depends on engine load

Fuel high pressure	Signal voltage (approx. values)	condition
Approx. 100 bar	0.5 VDC	Ignition ON.
Approx. 350 bar	1.2 VDC	
Approx. 400 bar	1.37 VDC	Idling (800 rpm)

Fuel high pressure	Signal voltage (approx. values)	condition
Approx. 500 bar	1.65 VDC	
Approx. 600 bar	1.93 VDC	
Approx. 800 bar	2.24 VDC	
Approx. 1000 bar	3.07 VDC	
Approx. 1200 bar	3.64 VDC	
Approx. 1400 bar	4.21 VDC	
Approx. 1500 bar	4.50 VDC	
Approx. 1600 bar (maximum pressure)	4.78 VDC	Place maximum load on tractor at the dynamometric brake.

NOTE: *Fuel pressure in the high-pressure accumulator (rail pressure) is read in the Deutz "Serdia" diagnostic program.*

Measuring point on the A051 - ECU, engine control unit (EDC 7). (X1671 separation point)	
Function	**Pin**
Earth	12
+ supply	13
Signal	14

NOTE: *see §36*
see §37
see §7
see §3

79 B087 fuel low pressure sensor

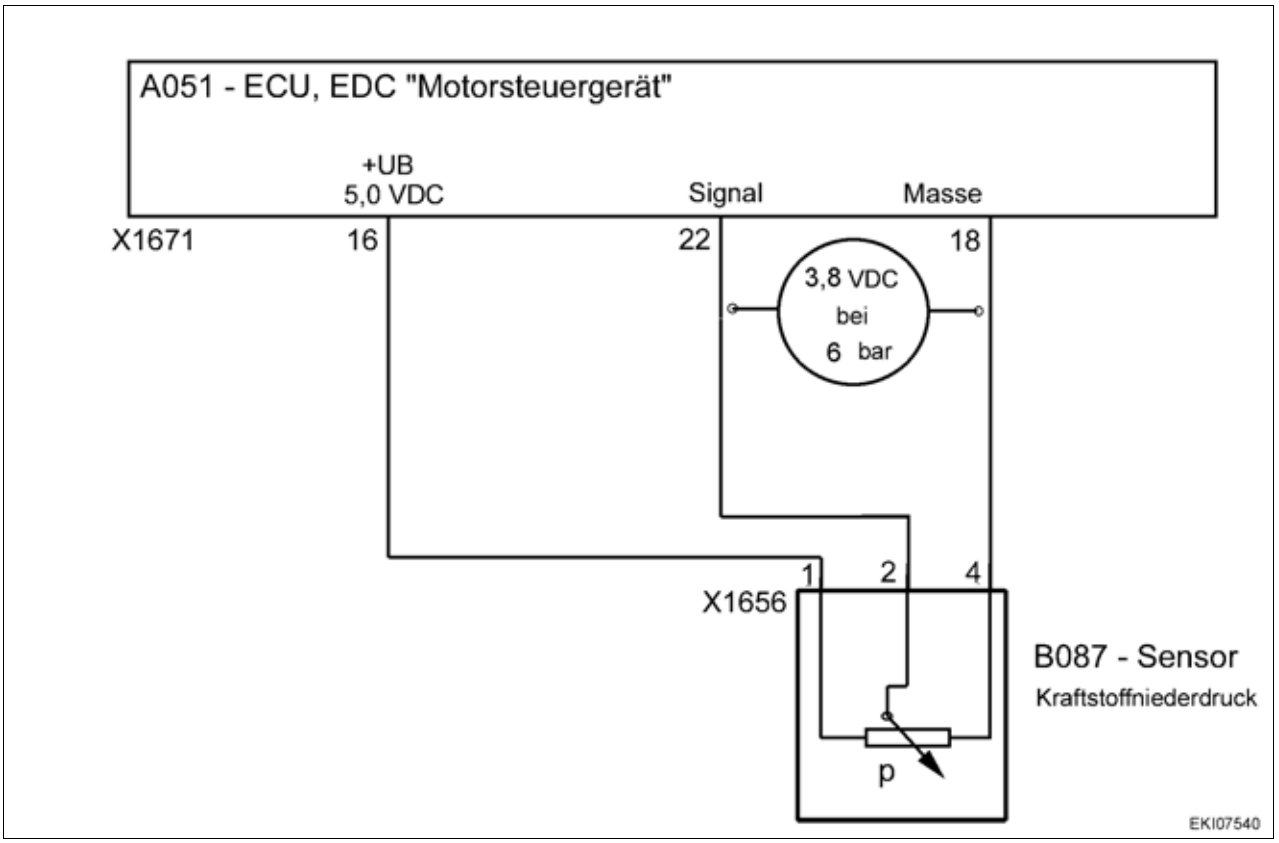


Fig. 298. I002045

Item	Designation	Note
A051 - ECU, engine control unit (EDC 7).		
X1671	Separation point on **A051** - ECU, engine control unit (EDC 7).	
Pin 18	B087 sensor earth	
Pin 16	+supply for the B087 sensor (+UB 5.0 VDC)	
Pin 22	Signal	
B087 - Fuel low pressure sensor		
X1656	Separation point on B087 sensor	
Pin 1	+ supply (+UB 5.0 VDC)	
Pin 2	Signal	
Pin 4	Earth	

Measuring points and signal values

Measuring points on the B087 - Fuel low pressure sensor X1656 separation point	
Pin	**Function**
1	+ supply
2	Signal
3	Not assigned
4	Earth



Fig. 299. I001087

NOTE: *Connect the X899.980.259.106 adapter cable directly to the **B087** - Fuel low pressure sensor.*
All readings +/- 10%

Prerequisite for this measurement:

– The fuel low pressure must be OK *see §2*

Measuring the internal resistance

Test	Pin	Specified value	condition	Possible cause of fault
Signal	2	120 Kohms	Switch off ignition.	
Earth	4			

Measure +power supply

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	1	5.0 VDC	Switch on ignition.	
Earth	4			

Measuring signal voltage

Test	Pin	Specified value	condition	Possible cause of fault
Signal	2	3.8 VDC	Start engine. (6 bar Fuel primary pressure)	
Earth	4			

Measuring point on the A051 - ECU, engine control unit (EDC 7). (X1671 separation point)	
Function	**Pin**
+ supply	16
Earth	18
Signal	22

NOTE: *see §36*
see §37
see §2

80 B088 sensor, crankshaft speed

NOTE: *see §9*

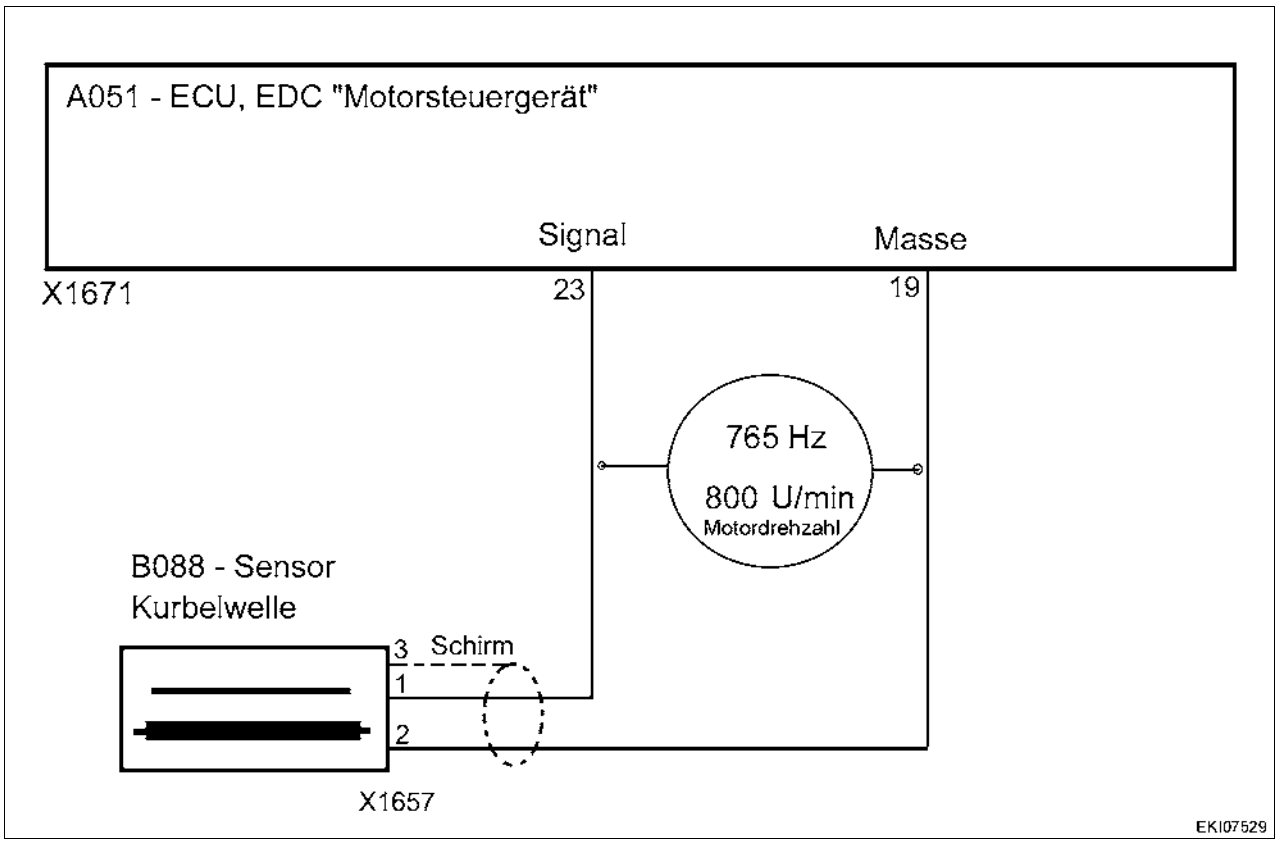


Fig. 300. I001597

Item	Designation	Note
A051 - ECU, engine control unit (EDC 7).		
X1671	Separation point on **A051** - ECU, engine control unit (EDC 7).	
Pin 23	Signal	
Pin 19	Earth	
B088 - Crankshaft speed sensor		
X1657	Separation point at B088 sensor	
Pin 1	Signal	
Pin 2	Earth	
Pin 3	Shield	

Measuring points and signal values

Measuring points on B088 sensor X1657 separation point	
Pin	**Function**
1	Signal
2	Earth
3	Shielding against interference

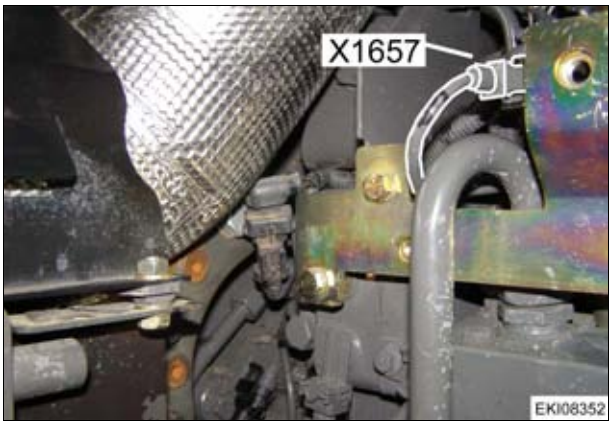


Fig. 301. I001598

NOTE: *Connect the X899.980.246.202 adapter cable directly to the **B088** - Crankshaft speed sensor.*
All readings +/- 10%

Measuring the internal resistance

Test	Pin	Specified value	condition	Possible cause of fault
Signal	1	Approx. 930 ohms	Ignition "OFF".	Reading infinity: component fault.
Earth	2			

Measuring induction voltage and frequency

B088 EDC (crankshaft) sensor Note: The voltage values vary according to the ambient temperature. The most important factor for measurement purposes is the ratio between the engine speed and the voltage. (i.e. double the engine speed -- double the voltage)		
Engine revolutions	**Induced voltage (alternating current VAC)**	**Frequency**
0 rpm (stationary)	0 VDC	0 Hz
800 rpm (idling)	Approx. 20 VAC	Approx. 770 Hz
1000 rpm	Approx. 23.1 VAC	Approx. 980 Hz
1200 rpm	Approx. 25.2 VAC	Approx. 1.16 KHz
1400 rpm	Approx. 27.0 VAC	Approx. 1.36 KHz
1600 rpm	Approx. 28.3 VAC	Approx. 1.54 KHz
1800 rpm	Approx. 29.5 VAC	Approx. 1.74 KHz
2000 rpm	Approx. 30.3 VAC	Approx. 1.94 KHz
2200 rpm	Approx. 31.0 VAC	Approx. 2.12 KHz
2300 rpm (no-load speed)	Approx. 31.3 VAC	Approx. 2.23 KHz

Measuring point on the A051 - ECU, engine control unit (EDC 7). (X1671 separation point)	
Function	**Pin**
Signal	23
Earth	19

NOTE: *see §36*
see §37
see §9

Checking permanent magnet of the inductive sensor

Checking permanent magnet of the inductive sensor
Hold inductive sensor against a metal plate.
The inductive sensor must "stick" to the metal plate.

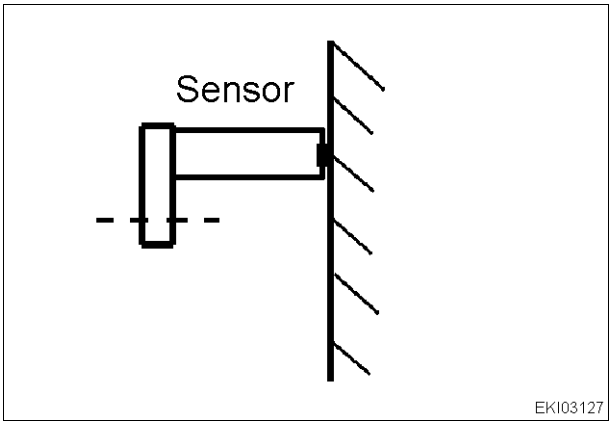


Fig. 302. I001546

Possible cause of fault

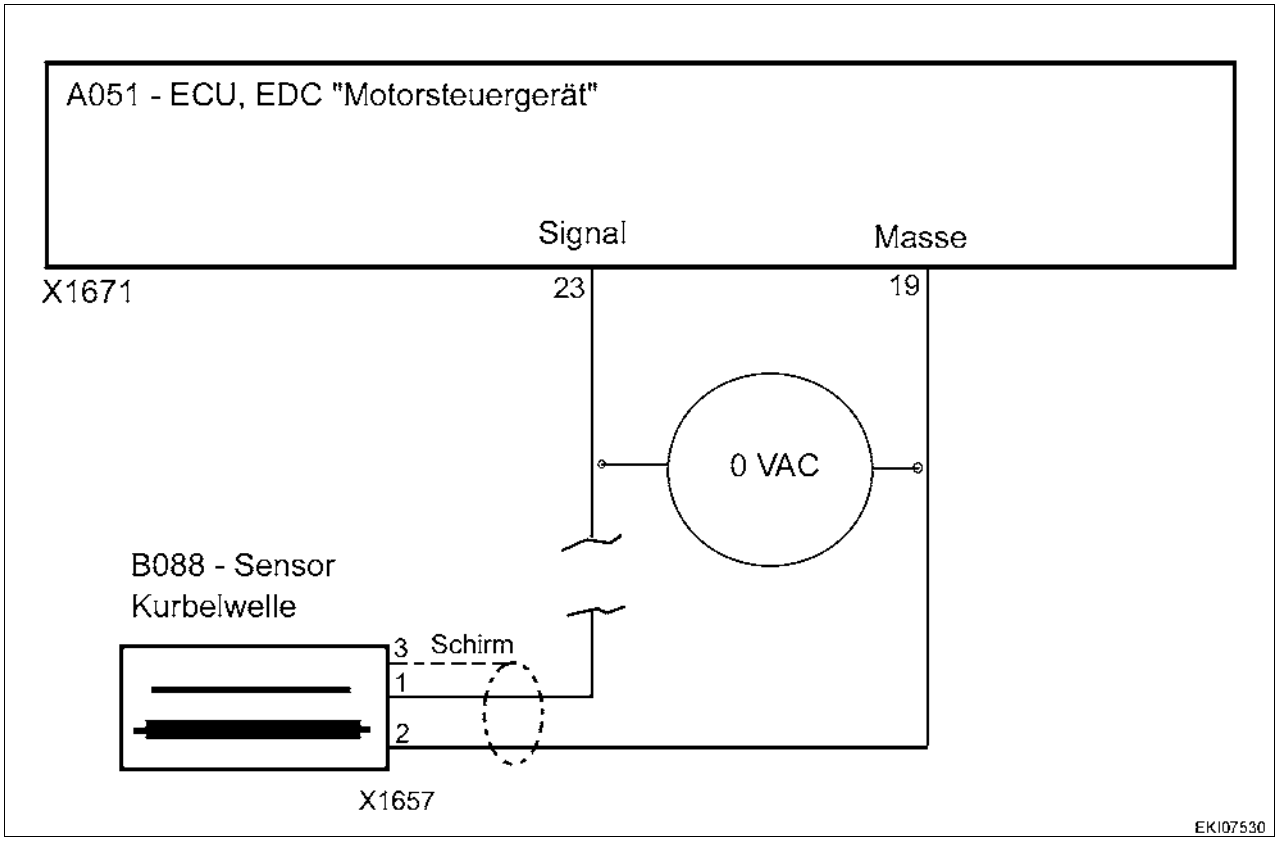


Fig. 303. I001599

Oscilloscope image of **B088** - Crankshaft speed sensor

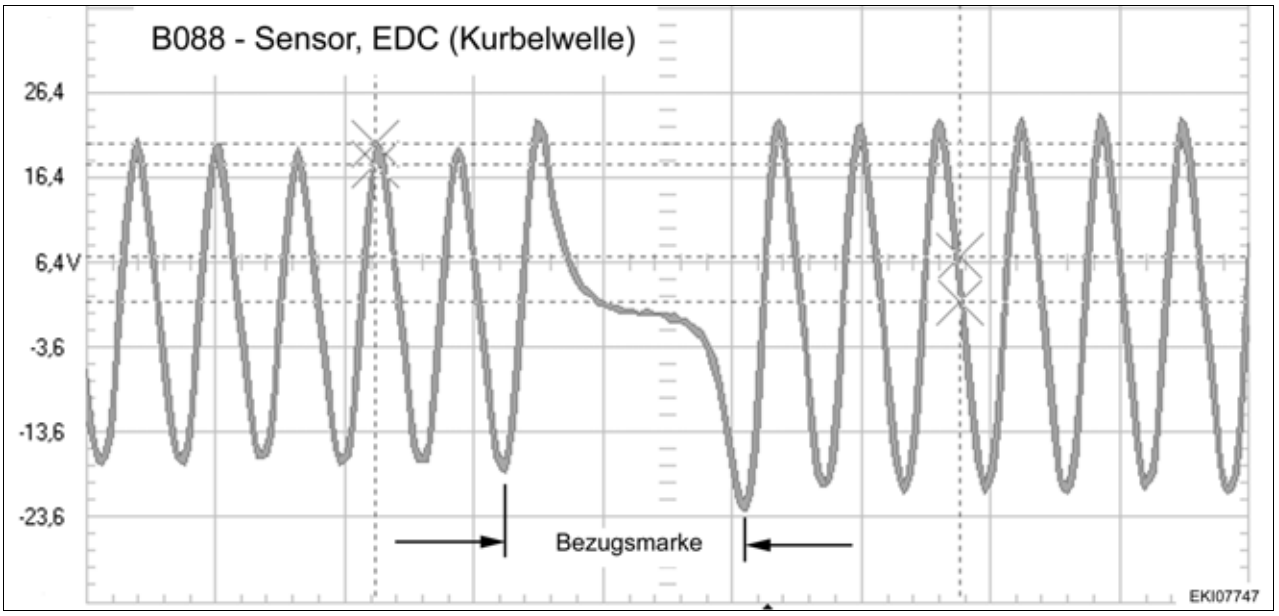


Fig. 304. I001600

Calculation of crankshaft revs (engine speed) on the basis of the oscilloscope display

SR Flywheel
delta t Time between voltage peaks

Using the voltage peaks, the **A051** - ECU, engine control unit (EDC 7). calculates the engine speed

Clearance of sensor to flywheel:
1.0 to 2.0 mm

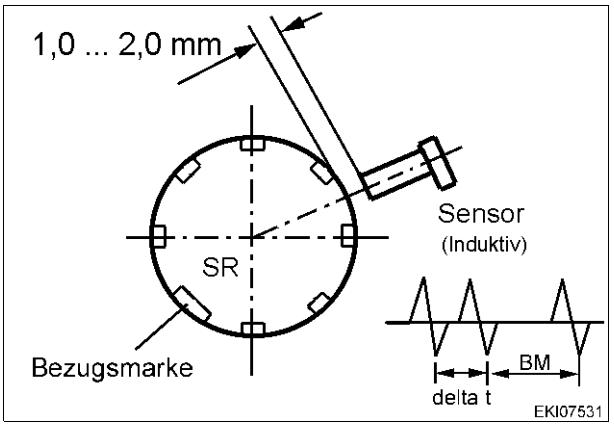


Fig. 305. I001601

Detection of current engine position

When the crankshaft is rotating, an AC voltage is induced in the **B088** - Crankshaft speed sensor by the marks on the flywheel.
The **A051** - ECU, engine control unit (EDC 7). calculates the engine speed from the voltage frequency
The gap (reference mark) between the markings causes a break in the induced voltage.
This break is used to determine the current position of the crankshaft and appears twice per working cycle.
The B085 sensor (camshaft) is necessary for synchronising injection. It delivers only 1 signal per working cycle, and must be aligned with the reference mark (of the 1st cylinder) on the crankshaft.

NOTE: ***Working cycle (4-stroke engine)***
2 crankshaft revolutions
1 camshaft revolution

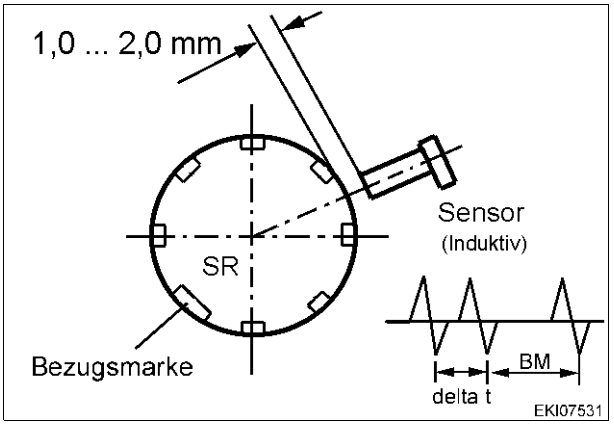


Fig. 306. I001601

81 B089 coolant temperature sensor

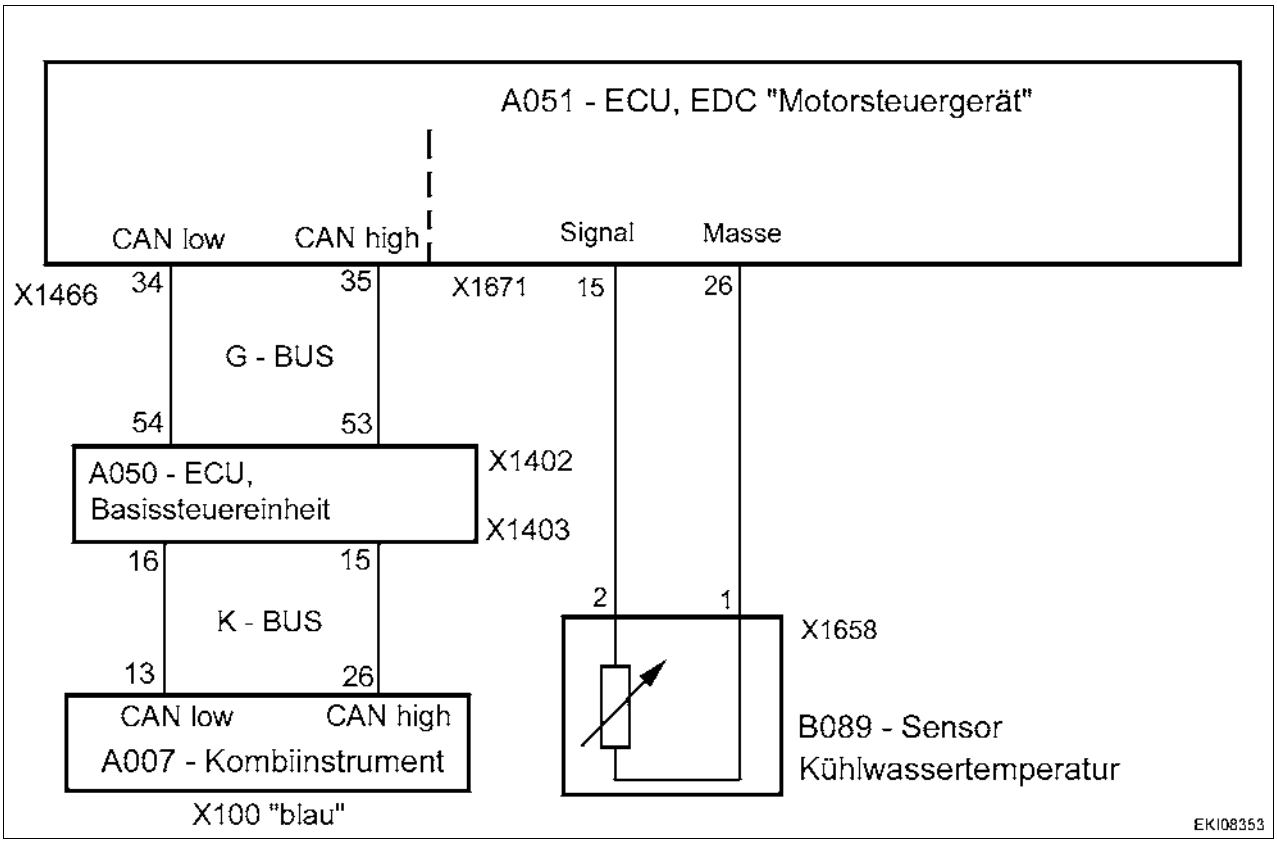


Fig. 307. I001603

Item	Designation	Note
A051 - ECU, engine control unit (EDC 7).		
X1466	Separation point on **A051** - ECU, engine control unit (EDC 7).	
X1671	Separation point on **A051** - ECU, engine control unit (EDC 7).	
Pin 15 (X1671)	Signal	
Pin 26 (X1671)	Earth	
Pin 34 (X1466)	Transmission bus_Low	
Pin 35 (X1466)	Transmission bus_High	
B089 - Engine temperature sensor (Deutz)		
X1658	Separation point on B089 sensor	
Pin 1	Earth	
Pin 2	Signal	
A050 - ECU, basic control unit		
X1402	Separation point on **A050** - ECU, basic control unit	
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 54 (X1402)	Transmission bus_Low	
Pin 53 (X1402)	Transmission bus_High	
Pin 16 (X1403)	Control bus_Low	
Pin 15 (X1403)	Control bus_High	

Item	Designation	Note
A007 - Instrument panel		
X100	"Blue" separation point on **A007** - Instrument panel	
Pin 13	Control bus_Low	
Pin 26	Control bus_High	

Measuring points and signal values

Measuring points on the B089 - Engine temperature sensor (Deutz) X1658 separation point	
Pin	**Function**
1	Earth
2	Signal

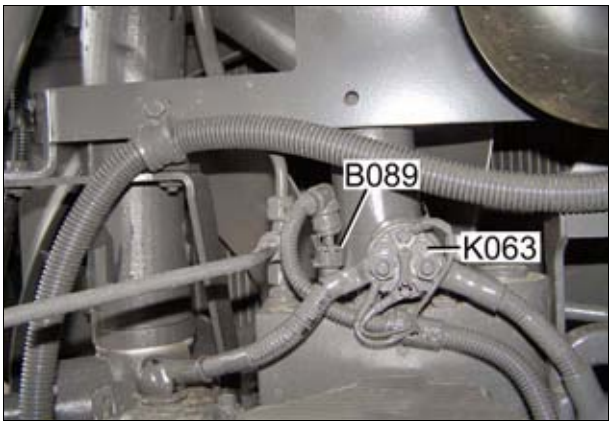


Fig. 308. I001088

Characteristic of B089 coolant temperature sensor

NOTE: *Connect the X899.980.259.104 adapter cable directly to the **B089** - Engine temperature sensor (Deutz). Heat up sensor in water bath*



Fig. 309. I001605

Coolant temperature (°C)	Resistance	Display on A007 instrument panel
-40	45.3 Kohms	
-30	26.1 Kohms	
-10	9.4 Kohms	
-5	7.4 Kohms	
0	5.9 Kohms	
5	4.7 Kohms	
10	3.8 Kohms	
20	2.5 Kohms	
25	2.1 Kohms	
30	1.7 Kohms	
40	1.2 Kohms	
50	800 ohms	

Coolant temperature (°C)	Resistance	Display on A007 instrument panel
60	600 ohms	
70	400 ohms	1 bar
74	380 ohms	2 bars
78	340 ohms	3 bars
82	300 ohms	4 bars
86	260 ohms	5 bars
90	240 ohms	6 bars
94	210 ohms	7 bars
98	190 ohms	8 bars
102	170 ohms	9 bars
106	150 ohms	10 bars
110	140 ohms	11 bars "red zone"
113	130 ohms	12 bars "red zone"

Measuring point on the A051 - ECU, engine control unit (EDC 7). (X1671 separation point)	
Function	**Pin**
Signal	15
Earth	26

NOTE: *see §36*
see §37
see §1

Check coolant temperature in A007 instrument panel
Connect the X899.980.259.104 adapter cable to the X1658 separation point (connection to B089 remains separate).
Connect the X 899.980.224 resistance decade.
Switch on ignition.
Select corresponding resistance (see table) and compare with display on the **A007** - Instrument panel.

NOTE: *Allow preconditioning time.*

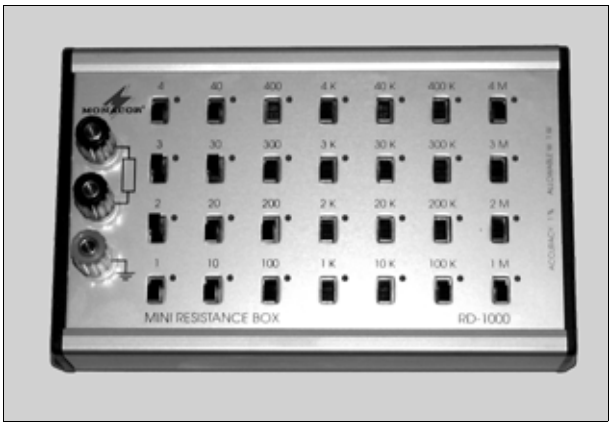


Fig. 310. I000639

Warning message: coolant temperature.

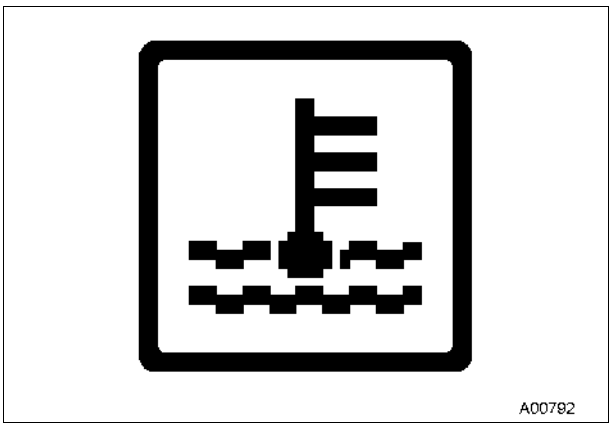


Fig. 311. I001606

Possible causes (selection) of excessive coolant temperature

Possible cause (selection)	Remedy
Water cooler contaminated	Clean water cooler
Coolant level too low	Top up with coolant, seal coolant system if necessary
Coolant thermostat faulty	Check coolant thermostat, replace if necessary
Water pump faulty	Replace water pump
B077 electr. viscous fan defective	Check B077 electrical viscous fan *see §73*

82 B090 engine oil pressure sensor

NOTE: *see §1*

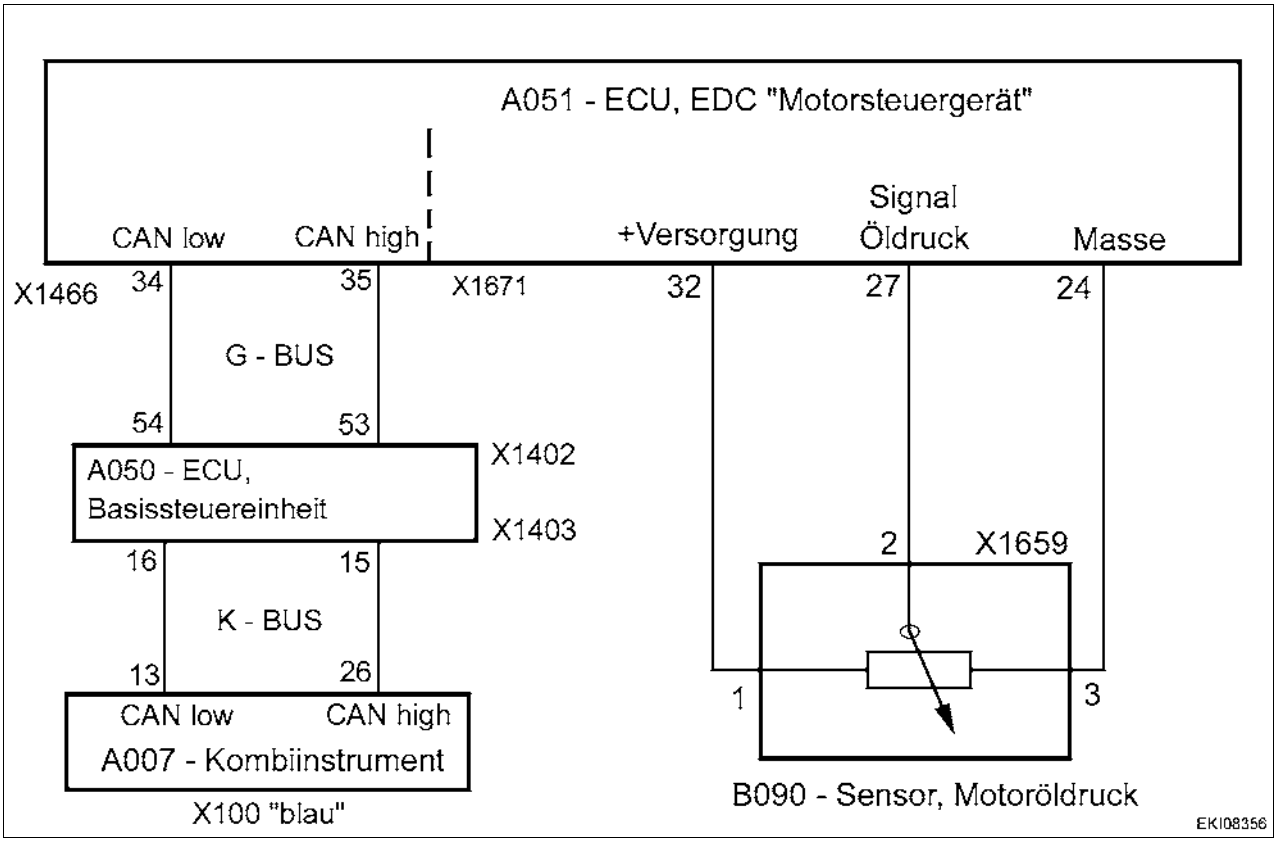


Fig. 312. I001614

Item	Designation	Note
A051 - ECU, engine control unit (EDC 7).		
X1466	Separation point on **A051** - ECU, engine control unit (EDC 7).	
X1671	Separation point on **A051** - ECU, engine control unit (EDC 7).	
Pin 24 (X1671)	Earth	
Pin 27 (X1671)	Signal	
Pin 32 (X1671)	+ supply (5.0 VDC)	
Pin 34 (X1466)	Transmission bus_Low	
Pin 35 (X1466)	Transmission bus_High	
B090 - Sensor, oil pressure		
X1659	Separation point on B090 sensor	
Pin 1	+ supply (5.0 VDC)	
Pin 2	Signal	
Pin 3	Earth	
A050 - ECU, basic control unit		
X1402	Separation point on **A050** - ECU, basic control unit	
X1403	Separation point on **A050** - ECU, basic control unit	

Item	Designation	Note
Pin 54 (X1402)	Transmission bus_Low	
Pin 53 (X1402)	Transmission bus_High	
Pin 16 (X1403)	Control bus_Low	
Pin 15 (X1403)	Control bus_High	
A007 - Instrument panel		
X100	"Blue" separation point on **A007** - Instrument panel	
Pin 13	Control bus_Low	
Pin 26	Control bus_High	

Measuring points and signal values

Measuring points on the B090 - Sensor, oil pressure X1659 separation point	
Pin	**Function**
1	+ supply
2	Signal
3	Earth



Fig. 313. I001087

NOTE: *Connect the X899.980.259.107 adapter cable directly to the **B090** - Sensor, oil pressure.*
Switch on ignition, engine is running.
All readings +/- 10%

Test	Pin	Specified value	Engine oil pressure	Note
+ supply	1	5.0 VDC		Inspect the A051 ECU, engine control unit
Earth	3			
Signal	2			
		0.5 VDC	1.0 bar	
		1.0 VDC	2.0 bar	
		1.5 VDC	3.0 bar	
		2.0 VDC	4.0 bar	
		2.5 VDC	5.0 bar	
		3.0 VDC	6.0 bar	
		3.1 VDC	6.3 bar	
Earth	3			

Measuring point on the A051 - ECU, engine control unit (EDC 7). (X1671 separation point)	
Function	**Pin**
Signal	27
Earth	24
+ supply	32

NOTE: *see §36*
see §37

Checking engine oil pressure with pressure gauge

Fit measurement adapter M10x1 (X598.303.000.000) on oil filter console (arrow).



Fig. 314. I002048

Minimum oil pressure at 120°C oil temperature, measured on the oil filter console

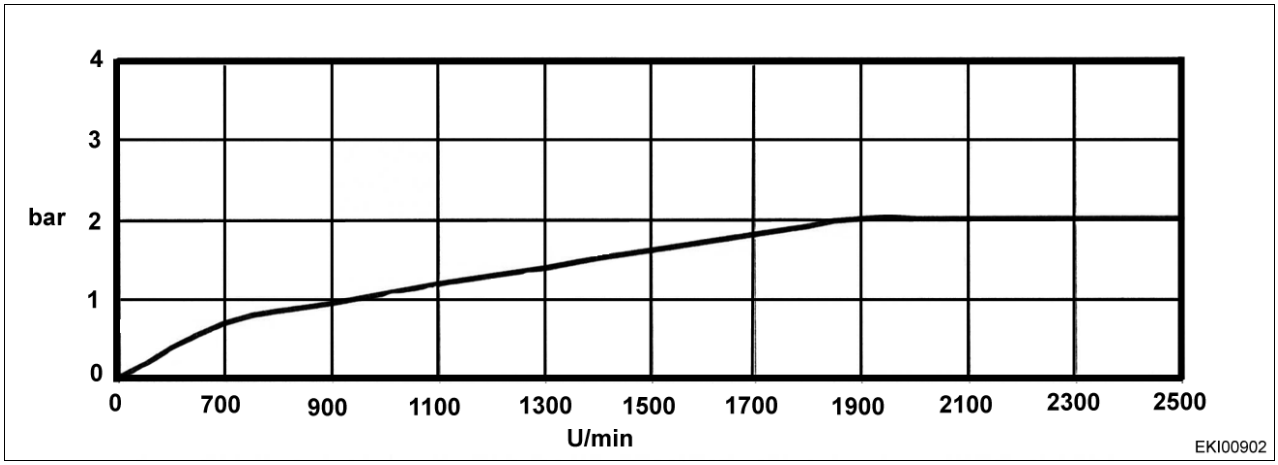


Fig. 315. I001615

If the specified pressures are not reached at the respective engine speeds, an error message appears on the **A007** - Instrument panel

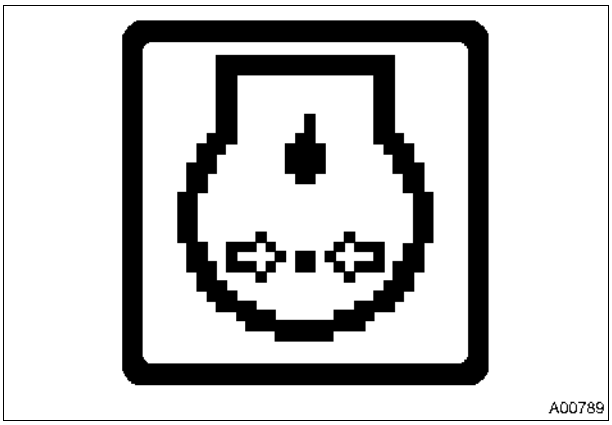


Fig. 316. I001616

83 B091 water in fuel sensor

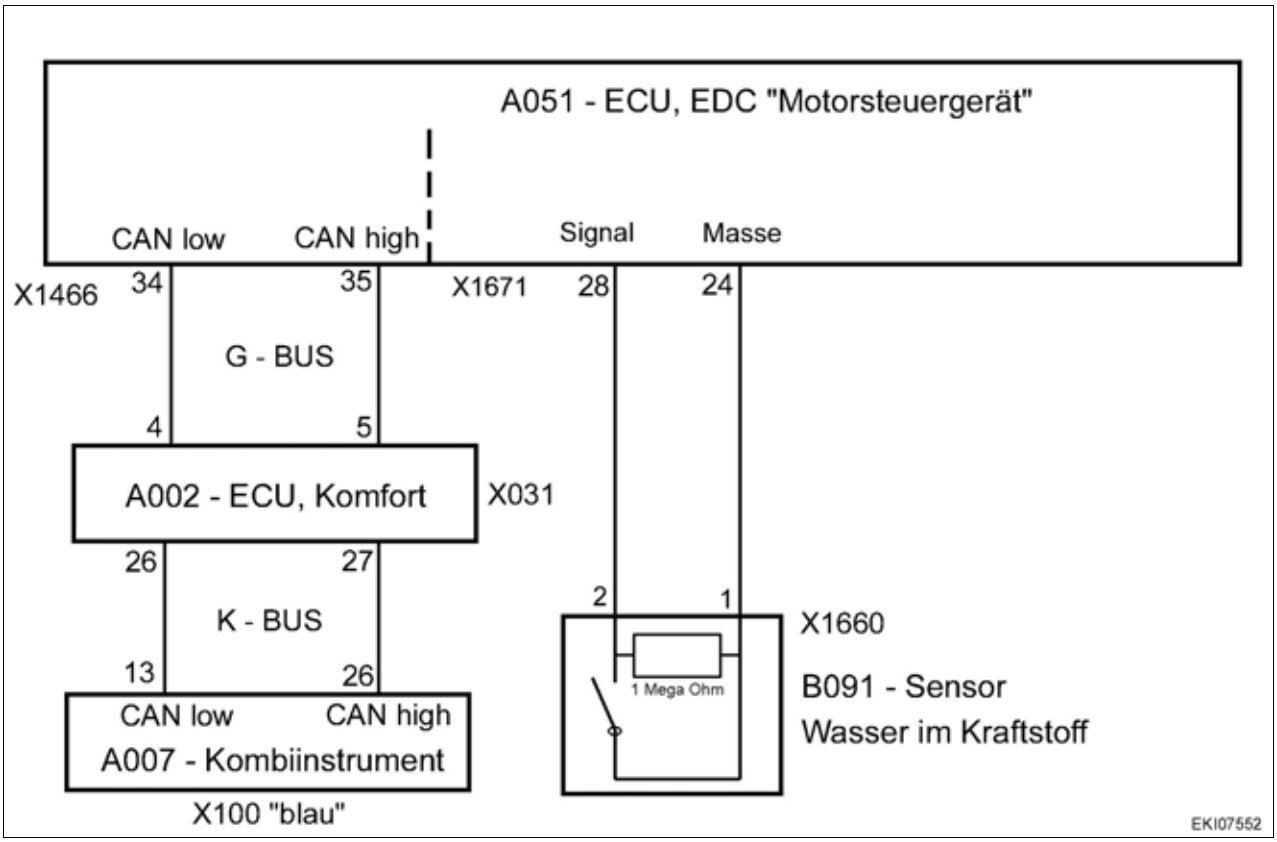


Fig. 317. I001619

Item	Designation	Note
A051 - ECU, engine control unit (EDC 7).		
X1466	Separation point on **A051** - ECU, engine control unit (EDC 7).	
X1671	Separation point on **A051** - ECU, engine control unit (EDC 7).	
Pin 24 (X1671)	Earth	
Pin 28 (X1671)	Signal	
Pin 32 (X1671)	+ supply	
Pin 34 (X1466)	Transmission bus_Low	
Pin 35 (X1466)	Transmission bus_High	
B091 - Sensor, water in fuel		
X1660	Separation point on B091 sensor	
Pin 1	Earth	
Pin 2	Signal	
A050 - ECU, basic control unit		
X1402	Separation point on **A050** - ECU, basic control unit	
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 54 (X1402)	Transmission bus_Low	
Pin 53 (X1402)	Transmission bus_High	

Item	Designation	Note
Pin 16 (X1403)	Control bus_Low	
Pin 15 (X1403)	Control bus_High	
A007 - Instrument panel		
X100	"Blue" separation point on **A007** - Instrument panel	
Pin 13	Control bus_Low	
Pin 26	Control bus_High	

Measuring points and signal values

Measuring points on the B091 - Sensor, water in fuel X1660 separation point	
Pin	**Function**
1	Earth
2	Signal

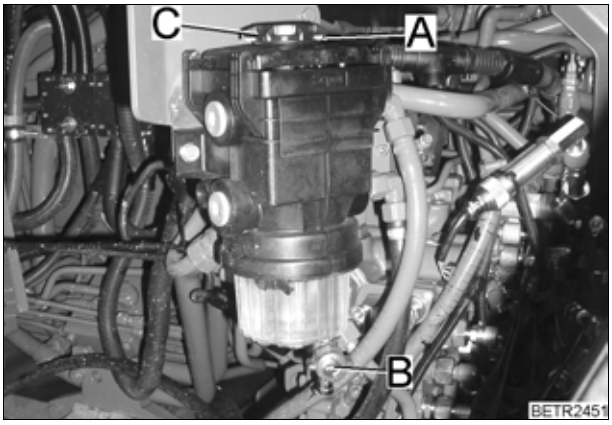


Fig. 318. I001585

NOTE: *Connect the X899.980.246.201 adapter cable directly to the **B091** - Sensor, water in fuel.*
All readings +/- 10%

Prerequisite for this measurement:

– Before carrying out the check, drain the water *see §1*

Test	Pin	Specified value	condition	Possible cause of fault
Signal	2			
		approx. 1 mega-ohm	Water level OK (switch open)	
		approx. 500 Kohms	Water level too high (switch closed)	
Earth	1			

Measuring point on the A051 - ECU, engine control unit (EDC 7). (X1671 separation point)	
Function	**Pin**
Signal	28
Earth	24

NOTE: *see §36*
see §37
see §2
see §11

84 B092 boost pressure/charge air temperature sensor

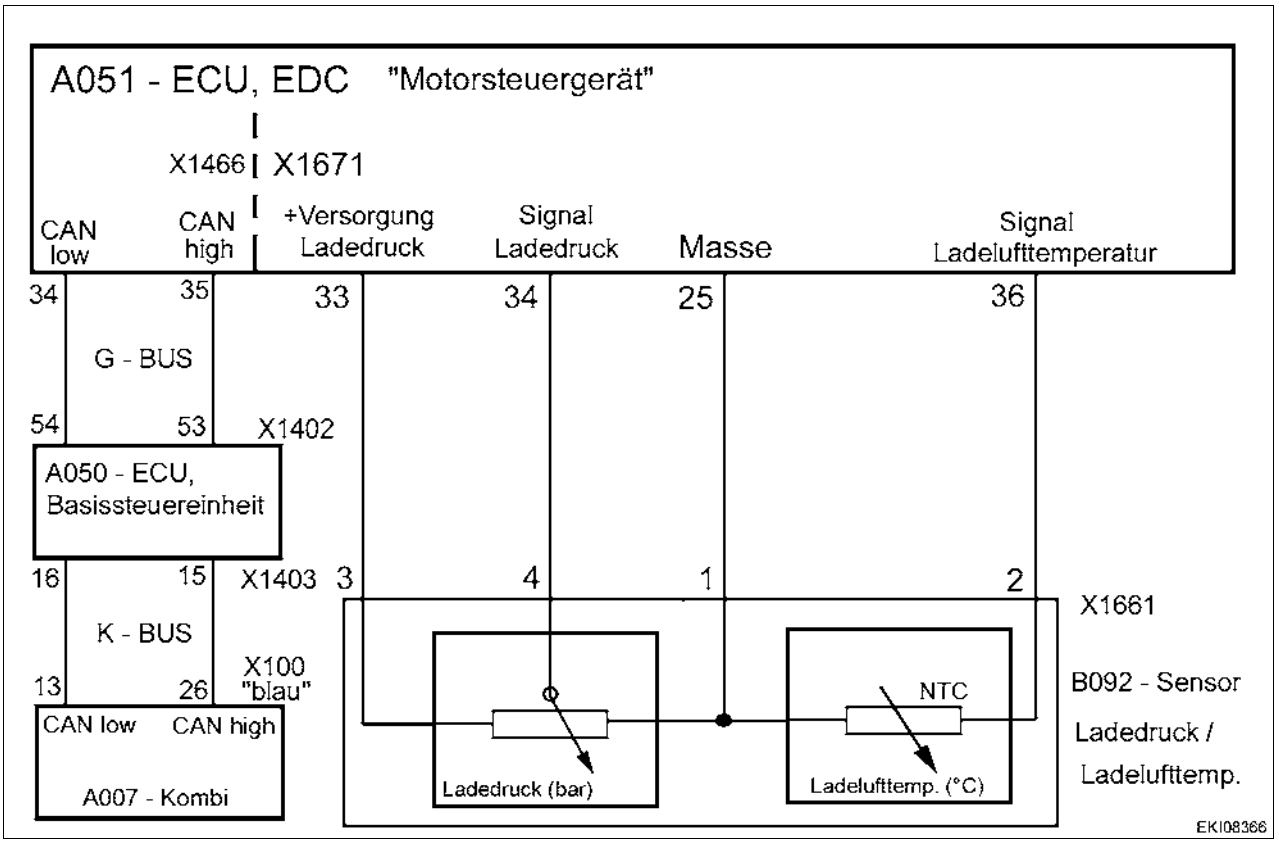


Fig. 319. I001630

Item	Designation	Note
A051 - ECU, engine control unit (EDC 7).		
X1466	Separation point on **A051** - ECU, engine control unit (EDC 7).	
X1671	Separation point on **A051** - ECU, engine control unit (EDC 7).	
Pin 25 (X1671)	Earth	
Pin 33 (X1671)	+ supply	
Pin 34 (X1671)	Signal (boost pressure)	Used for controlling the engine.
Pin 36 (X1671)	Signal (charge air temperature)	Used to display the warning message on the A007 instrument panel.
Pin 34 (X1466)	Transmission bus_Low	
Pin 35 (X1466)	Transmission bus_High	
B092 - Sensor, charge air pressure/temperature		
X1661	Separation point on B092-sensor	
Pin 1	Earth	
Pin 2	Charge air temperature signal	
Pin 3	+ supply	
Pin 4	Boost pressure signal	

Item	Designation	Note
A050 - ECU, basic control unit		
X1402	Separation point on **A050** - ECU, basic control unit	
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 54 (X1402)	Transmission bus_Low	
Pin 53 (X1402)	Transmission bus_High	
Pin 16 (X1403)	Control bus_Low	
Pin 15 (X1403)	Control bus_High	
A007 - Instrument panel		
X100	"Blue" separation point on A007 instrument panel	
Pin 13	Control bus_Low	
Pin 26	Control bus_High	

Measuring points and signal values

Measuring points on the B092 - Sensor, charge air pressure/temperature X1661 separation point	
Pin	**Function**
1	Earth (for charge air temperature and boost pressure)
2	Signal (charge air temperature)
3	+supply 5.0 VDC (for boost pressure sensor)
4	Signal (boost pressure)

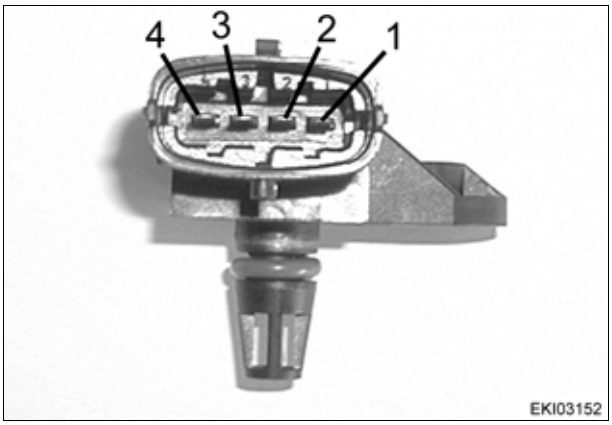


Fig. 320. I001631

NOTE: *The B092 sensor (charge air temperature) is an NTC sensor (negative temperature coefficient). As the temperature increases, the resistance in the sensor decreases.*

Checking charge air temperature sensor

Temperature	Resistance	Fault code
[°C]	[ohms]	
-30	27K	
-20	16K	
-10	9.4K	
-5	7.4K	
0	5.9K	
5	4.7K	
10	3.8K	
20	2.5K	
30	1.7 K	
60	610	
70	450	
80	330	
90	250	
95	210	
100	190	
110	**140**	**Warning message, acoustic alarm**
120	110	
130	85	

NOTE: *All readings +/- 10%.*

Verifying warning message (charge air temperature) on the A007 instrument panel

Check warning message with the X899.980.224 resistance decade.
Switch off ignition
Connect the X899.980.259.102 adapter cable and the X 899.980.224 resistance decade to the wiring harness only.
Select the corresponding resistance (i.a.w. table).
Switch ignition ON.
Acoustic alarm and warning message will be displayed on the **A007** - Instrument panel.

NOTE: *The charge air temperature can be read out in the DEUTZ "SERDIA" diagnostic program.*

NOTE: *Observe preconditioning time.*

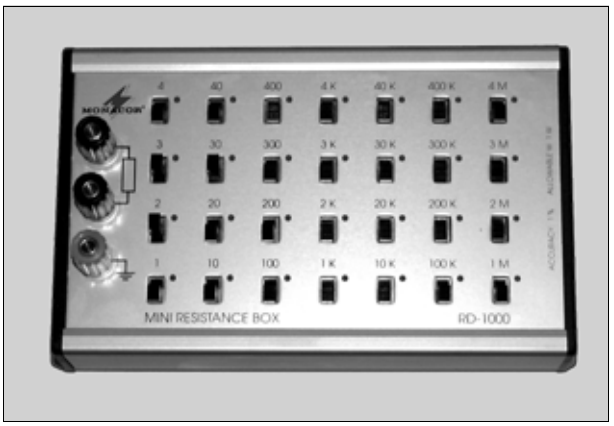


Fig. 321. I000639

Charge air temperature warning message.

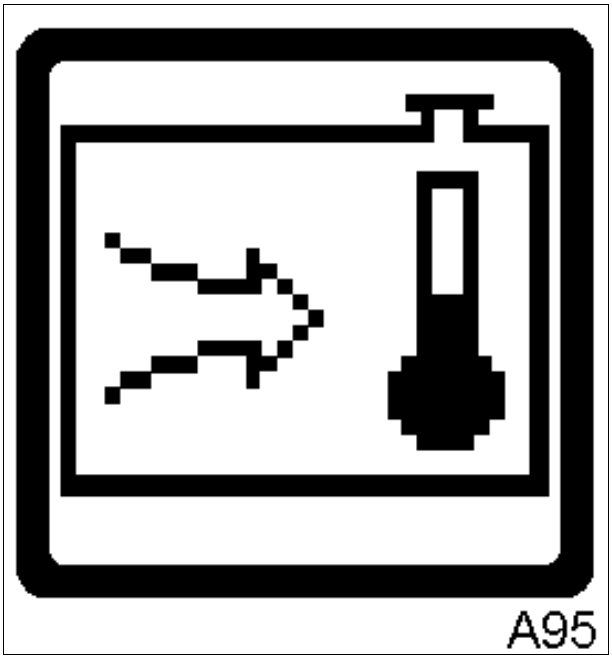


Fig. 322. I001633

Checking the boost pressure sensor

Test	Pin	Specified value	condition	Possible cause of fault
Supply	3	5.0 VDC		A051 ECU, engine control unit or in wiring.
Earth	1			
Signal	4	Approx. 1.0 VDC	Engine cold, engine stationary.	**A.) Reading 0 VDC** Fault in component or wiring (signal circuit). **B.) Reading: 4.8 VDC** Fault in component or wiring (earth circuit).
		Approx. 1.0 VDC	Engine cold, engine running (approx. 800 rpm).	
		Approx. 1.6 VDC	Approx. 2200 rpm (no-load speed).	
Earth	1			

Dependence of signal voltage on B092 sensor for diesel engine boost pressure

p [bar] Boost pressure (pressure above atmospheric air pressure)
U [VDC] Signal voltage at B092 sensor

Place diesel engine under load using the dynamometric brake.
(The turbocharger will build up boost pressure.)

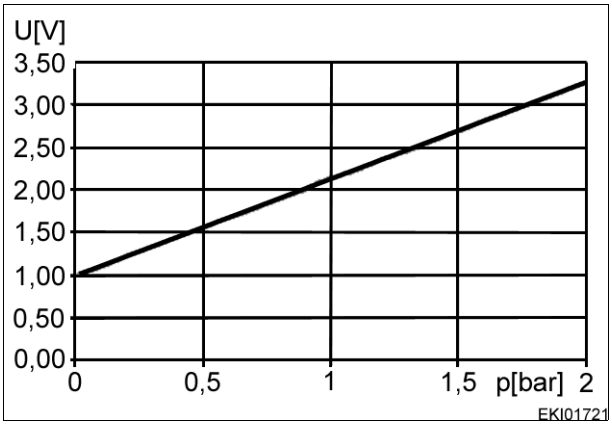


Fig. 323. I001635

Boost pressure (bar)	Signal voltage (VDC)
0	Approx. 1.0
0.5	Approx. 1.55
1.0	Approx 2.1
1.6	Approx. 2.7

The signal voltage increases as the boost pressure rises.
Signal voltage (1.0 VDC … approx. 2.7 VDC) = boost pressure 0 … approx. 1.6 bar

Measuring the boost pressure
Remove the B092 sensor.
Install X 899.980.294.000 adapter.
Screw in pressure gauge.
Max boost pressure = approx. 1.6 bar

NOTE: *Check engine oil level.*
Check coolant level.
Drive tractor to operating temperature.
Place diesel engine under load using dynamometric brake (the turbocharger builds up boost pressure).

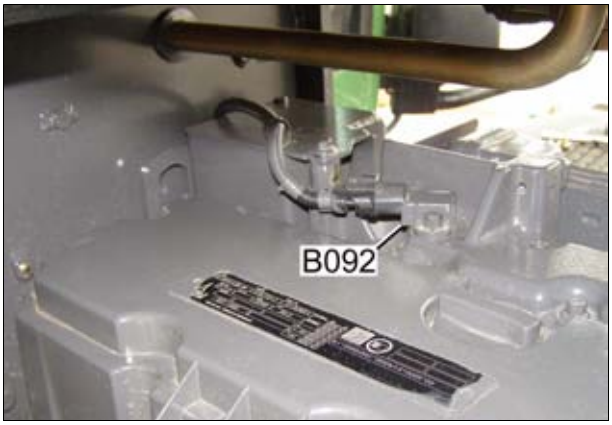


Fig. 324. I001089

Measuring point on the A051 - ECU, engine control unit (EDC 7). (X1671 separation point)	
Function	**Pin**
Earth	25
+ supply	33
Boost pressure signal	34
Charge air temperature signal	36

NOTE: *see §36*
see §37
see §12

85 E - work light (XENON)

E070 - Work lights, front right roof, external
E071 - Work lights, front left roof, external



Fig. 325. I000489

E078 - Work light, rear right mudguard (optional Xenon)
E079 - Work light, rear left mudguard (optional Xenon)



Fig. 326. I000491

E108 - Work light, right A pillar (optional Xenon)
E109 - Work light, left A pillar (optional Xenon)



Fig. 327. I000494

E116 - Work lights, Xenon front right roof, external
E117 - Work lights, Xenon front left roof, external



Fig. 328. I002038

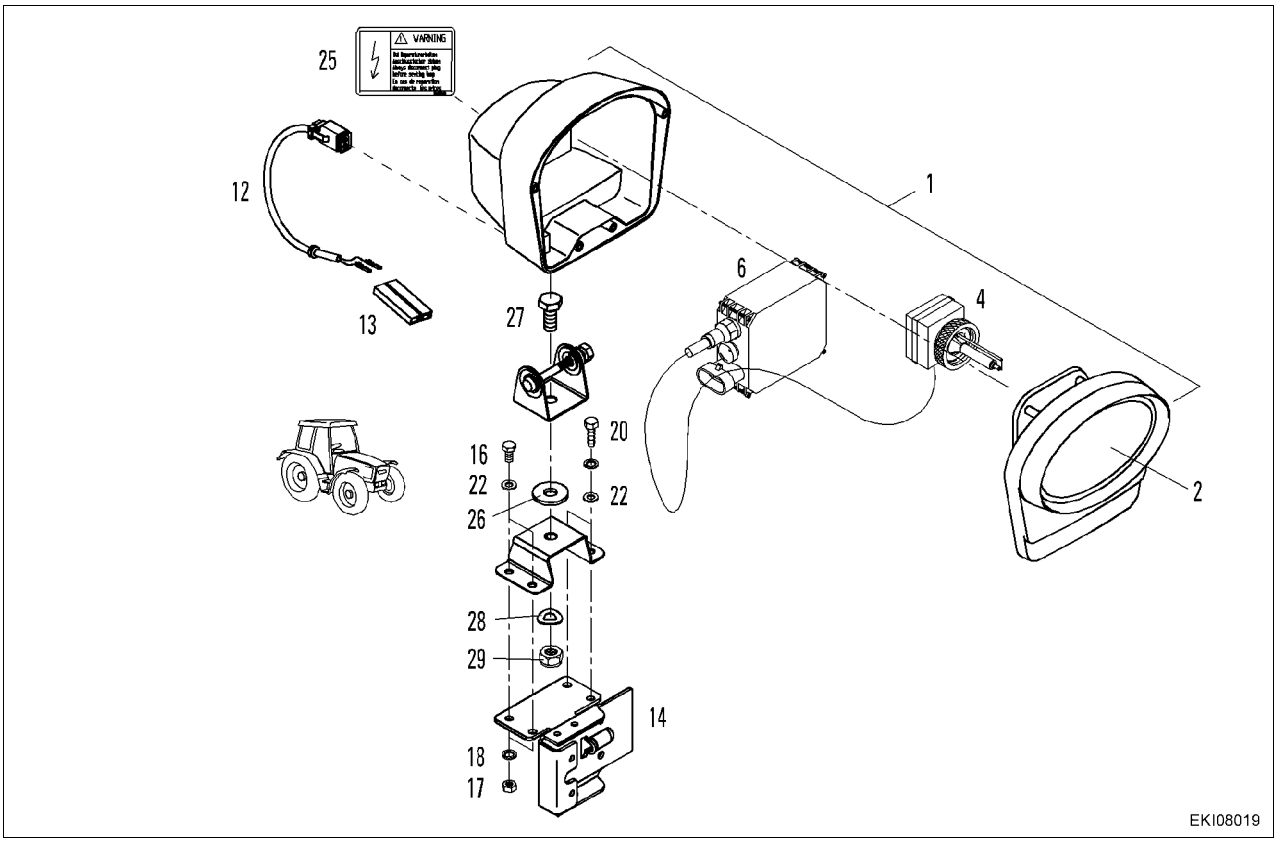


Fig. 329. I002189

Item	Designation	Item	Designation
1	Work lights	17	Hex nut
2	Lamp housing	18	Spring washer
4	Gas discharge lamp ("burner") DS1 35 W X 825.283.480.000	20	Sheet metal screw
		22	Washer
		25	Decal
6	Ballast unit ("igniter")	26	Friction disc
12	Cable set	27	Hex screw
13	Connector	28	Spring washer
14	Bracket right/left	29	Hex nut
16	Hex screw		

Function of the E headlight (XENON)

The XENON headlight is basically comprised of a gas discharge lamp ("burner") and a ballast unit ("igniter").

When the XENON headlight is switched on, the ballast unit ("igniter") produces a very high voltage (ca. 25,000 VDC).

This produces an arc in the gas discharge lamp ("burner").

The gas, which is sealed in the gas discharge lamp ("burner"), becomes conductive and emits work light.

The "ignition voltage" drops off.

When igniting the arc: Voltage approx. 25,000 VDC, current consumption approx. 20 A. During operation approx. 42 W power consumption (12 VDC/3.5 ADC) per headlight.

When operating the E headlight (XENON), observe the following:

– Turning on several XENON headlights simultaneously may cause an overload in the on-board power system, due to a sudden trigger current (approx. 20 A per work light). **Switch the XENON headlights on one after another, with enough time in between, while the diesel engine is running.**

– Due to the design of the gas discharge lamp ("burner"), the horizontal tilt should not exceed +/- 35°, otherwise the service life of the lamp will be reduced considerably.

– Do not look directly into the intense light.
– Clean the glass lens (item 2) occasionally when cold.
– Do not use cleaning agents that are aggressive or scratch.

CAUTION: Do not clean the hot glass lens (item 2) with fluids when the light is switched on. Danger of cracking!

DANGER: Always remove connector plug A when servicing or repairing (headlight operates with high voltage) !



Fig. 330. I007851

Safety precautions for replacing the gas discharge lamp ("burner") !

– Always switch off the headlight when replacing the bulb ("burner") and disconnect from power supply.
– Never reach into the bulb socket!
– The electrical connection between the gas discharge lamp ("burner") and ballast unit ("igniter") is a high voltage connection and must not be disconnected.
– The ballast unit ("igniter") must not be operated without the gas discharge lamp ("burner"), since dangerous voltage peaks may occur at the bulb socket and cause damage.
– Allow the gas discharge lamp ("burner") to cool.
– Wear protective goggles and gloves when changing the gas discharge lamp ("burner").
– The glass tube of the gas discharge lamp ("burner") is filled with various gases and metal halides and is under pressure (danger of shattering !).
– Never touch the glass bulb on the gas discharge lamp ("burner"), only touch the lamp at the base.
– Carefully remove fingerprints from the bulb with a clean cloth and alcohol.
– Only operate the gas discharge lamp ("burner") in a closed headlight.
– If the gas discharge lamp ("burner") should break within a closed room (workshop), the room must be aired at least 20 minutes and all people must leave the room, to prevent health hazards through contact with the gases.
– Removed gas discharge lamps ("burners") must be disposed of as hazardous waste.

86 EU control device (digital tachograph)

NOTE: *An EU control device is used to monitor driving and rest times.*

Since 05/2006, an EU control device is mandatory if:	
Tractor usage	The tractor is used for **non-agricultural transport** purposes
Permissible speed	**faster than 40 Km/h** **Note:** Vehicles with a permissible speed up to 40 Km/h do not require an EU control device (EU directive data 01/02/2006)
Operating range	**greater than 50 Km**

NOTE: *If the tractor is used solely for agricultural work/transport, an EU control device is not mandatory.*

EU control device (digital tachograph)



Top right in cab roof

NOTE: *Authorised specialist dealers (e.g. VDO, MB, MAN etc.) bear responsibility for the correct installation, testing and approval of the EU control unit.*



Fig. 331. I004891

NOTE: *When installing an EU control device, it must be considered that it must be connected to permanent plus on tractors with a K068 battery disconnect relay (S092 switch).*

See also:
Chapter 9000 Reg.C -
Electrical circuit diagram, +supply (sheet 2)
Electrical circuit diagram, radio (sheet 19)



Fig. 332. I001139

Cable routing from EU control device



Fig. 333. I004895

Speed sensor



On right trumpet housing

NOTE: *The authorised specialist retailer (e.g. VDO, MB, MAN etc.) is responsible for ensuring that the sensor is connected properly*



Fig. 334. I004892

Cable routing from speed sensor



Fig. 335. I004894

Cable routing from speed sensor



Fig. 336. I004893

Rear axle with ratchet wheel for the speed sensor (EU control unit)

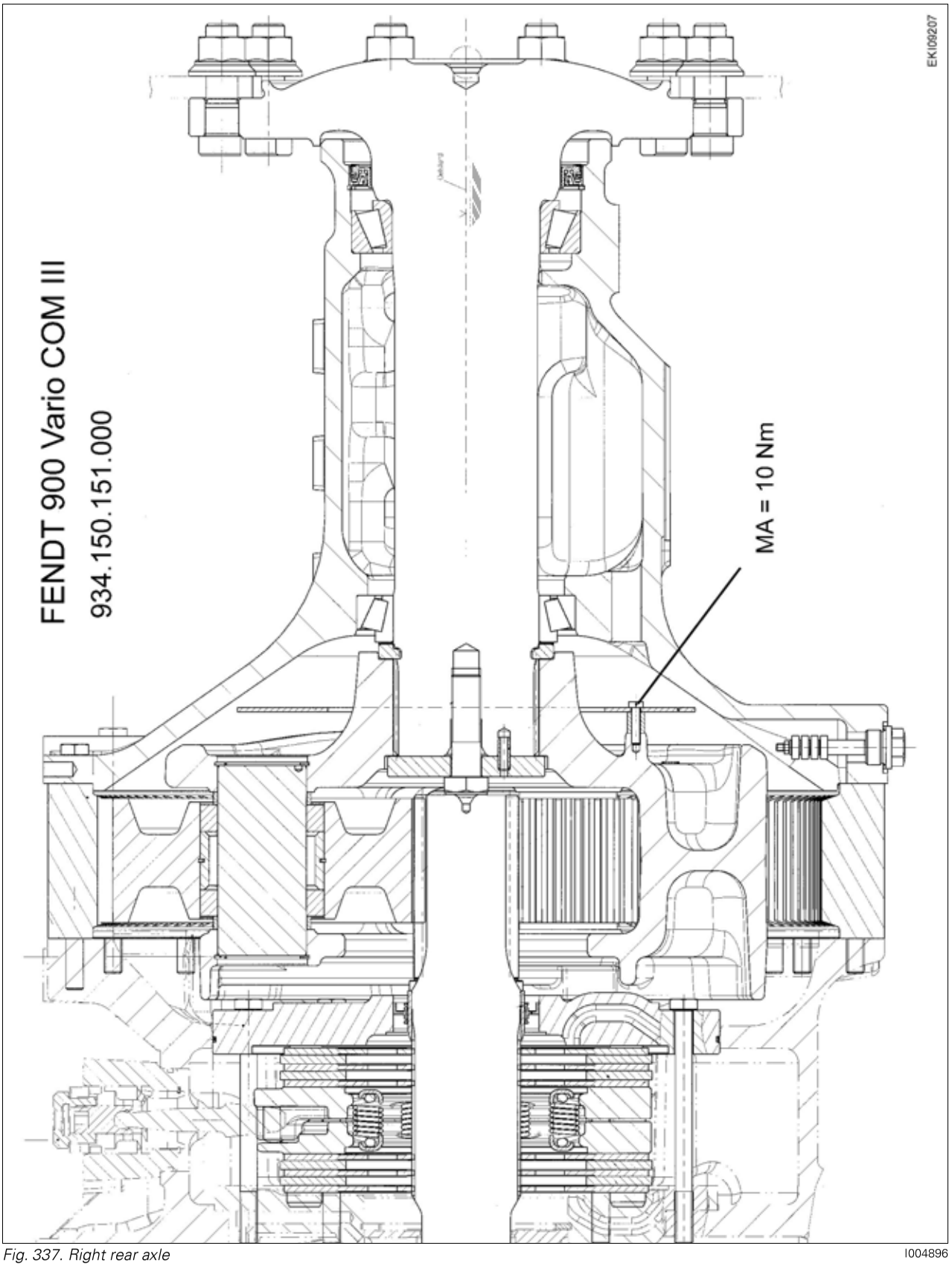


Fig. 337. Right rear axle

I004896

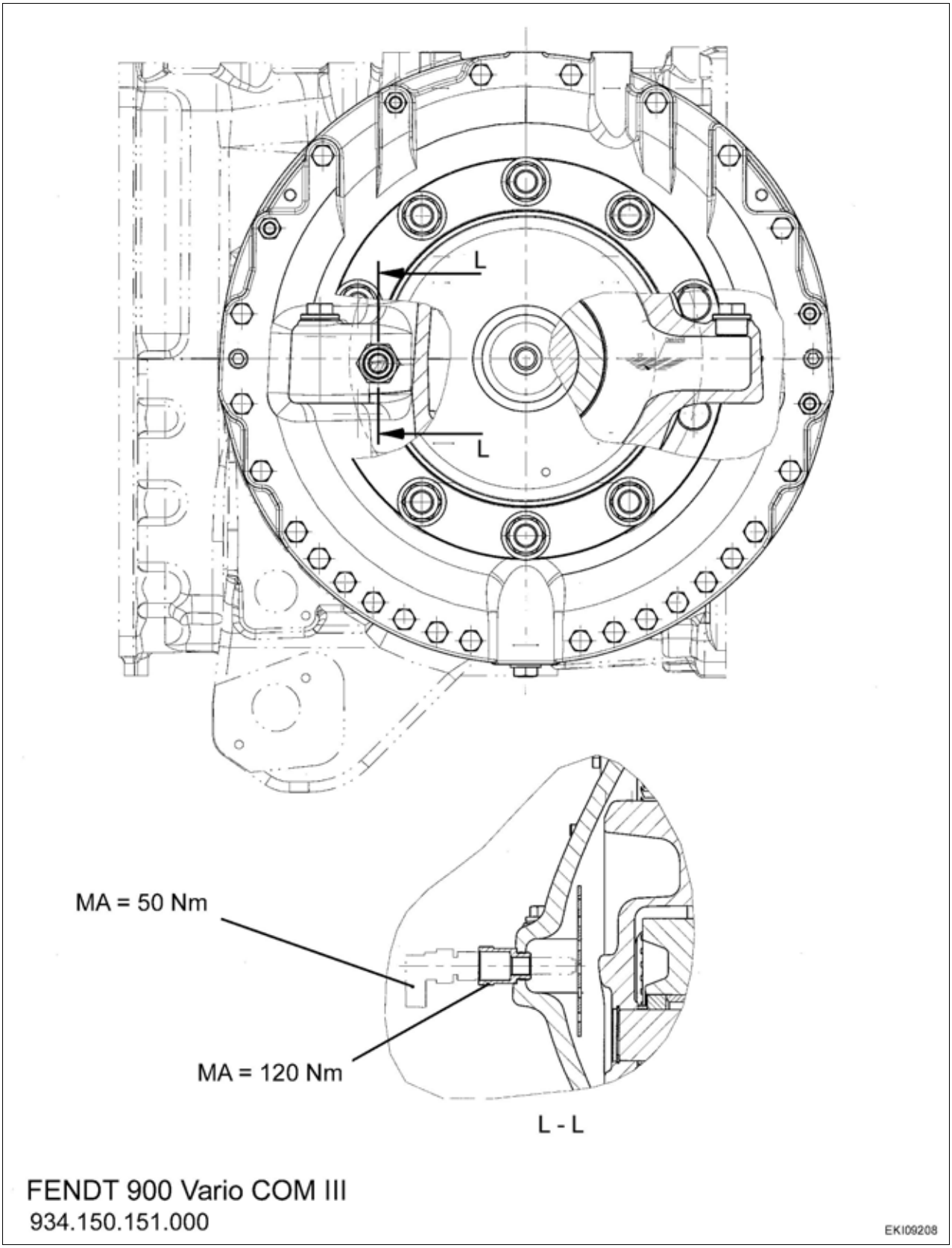


Fig. 338. Right rear axle

I004897

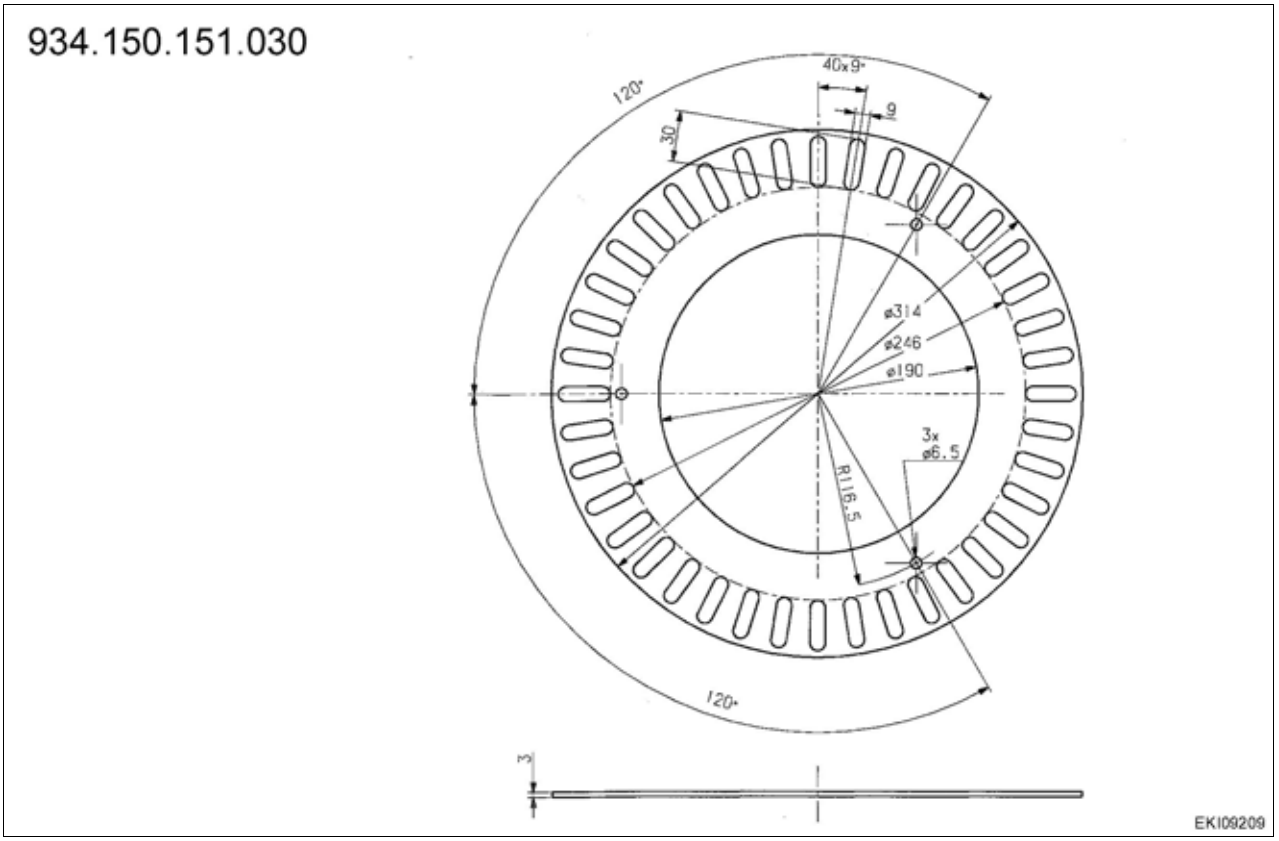


Fig. 339. Ratchet wheel

I004898

87 E063 heater element (air dryer)

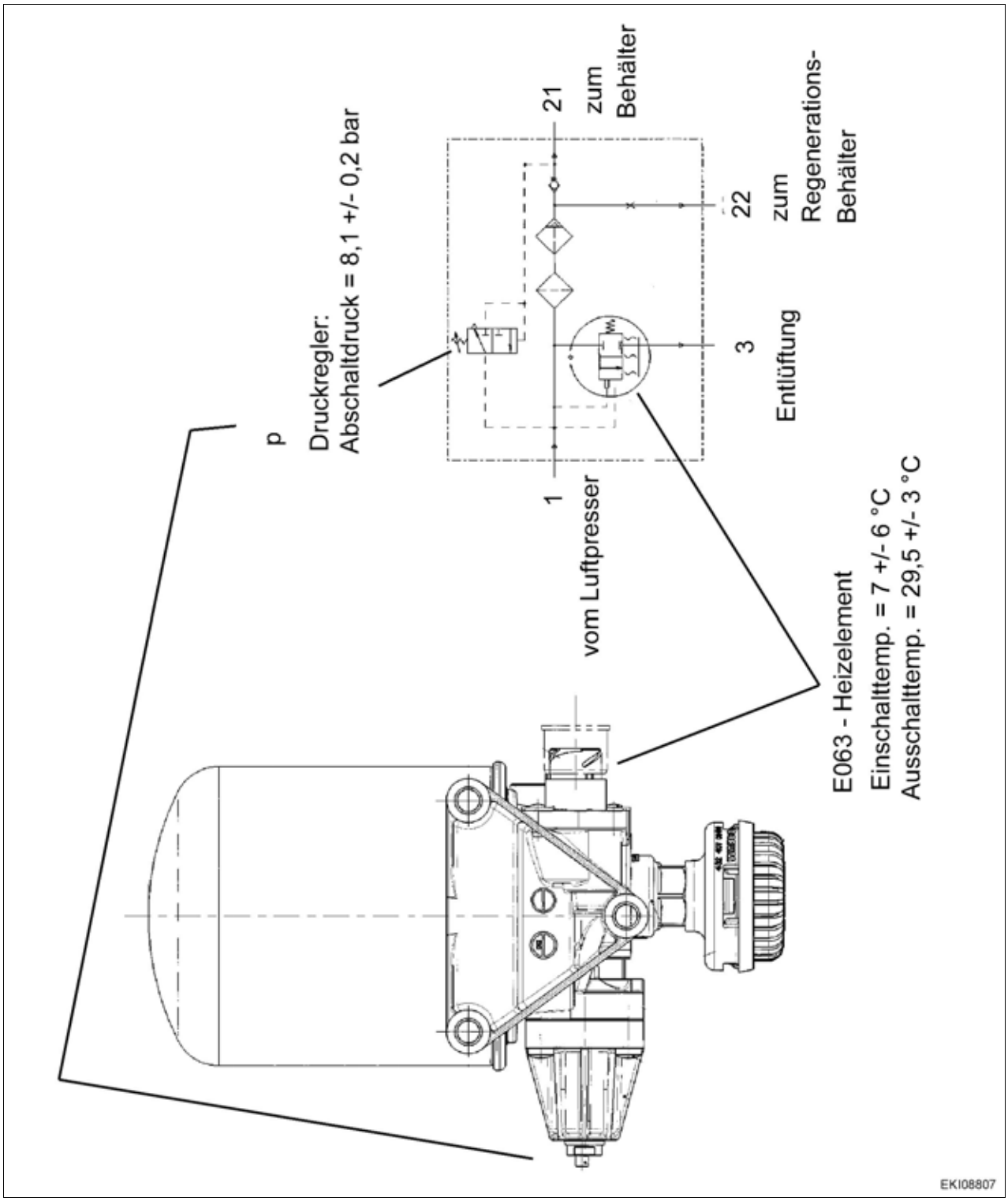


Fig. 340. I002745

Item	Designation	Item	Designation
1	from air compressor	**22**	to the regeneration tank
3	Air bleed	**p**	**Pressure controller:** **Cut-out pressure = 8.1 +/- 0.2 bar**
21	to the tank	**E063**	**Heater element:** **Switch-on temperature = 7 +/- 6°C** **Switch-off temperature = 29.5 +/- 3°C**

E063 - Heater element, air dryer (temperature-controlled)



Behind right rear axle



Fig. 341. I000486

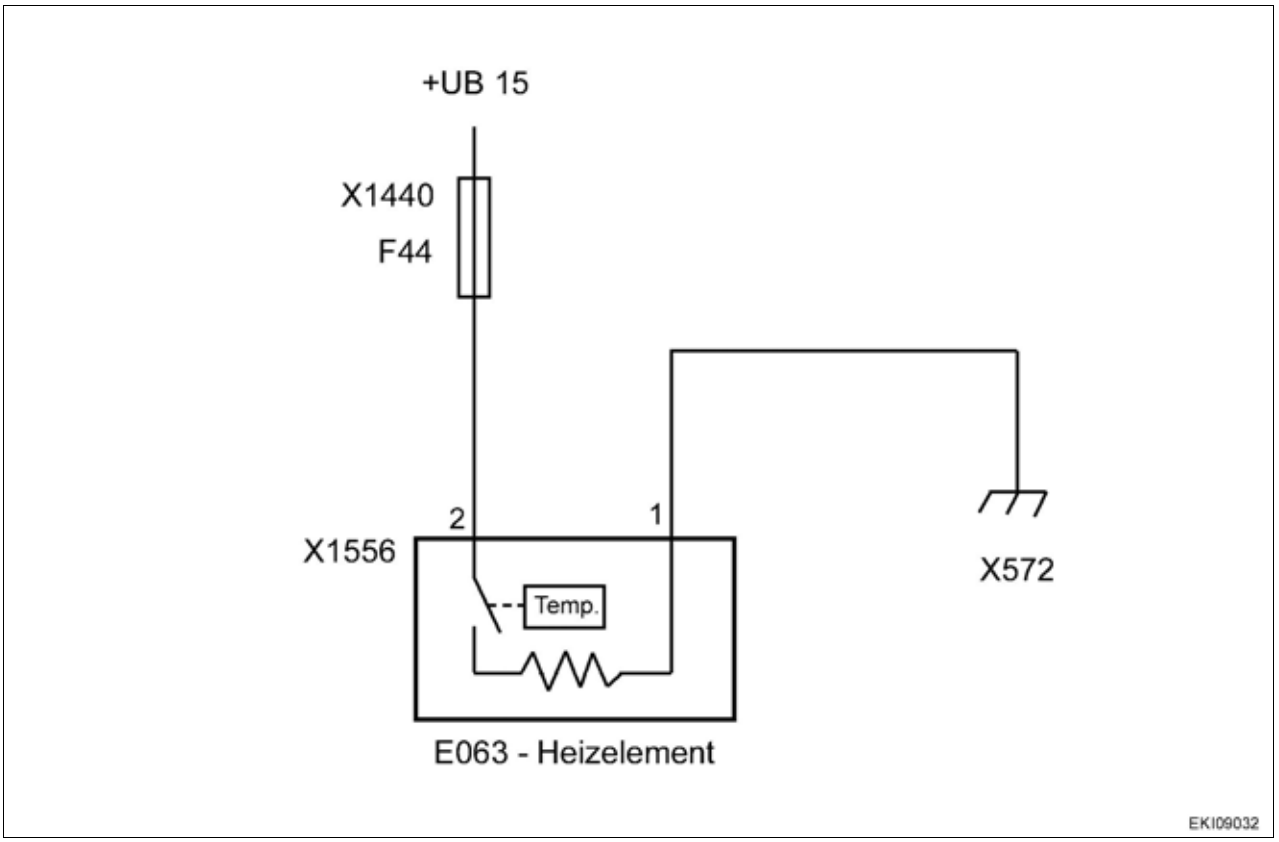


Fig. 342. I003634

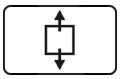
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88 G001 battery / K068 battery disconnect relay

G001 Battery (12 VDC/170 Ah)



On right entry step.



Remove cover.



Fig. 343. I001104

Technical data		
	Specified value	**Note**
Rated voltage	12 VDC	The rated voltage depends on the number of cells. A battery with a rated voltage of 12 VDC has 6 cells (1 cell = 2 VDC)
Rated capacity	170 Ah	The rated capacity depends on the size of the battery and indicates the amount of electricity that can be drawn. If the rated capacity is divided by 20, for example, the result is the rated current that can be drawn from a battery during a period of 20 hours. A battery with 170 Ah can supply a current of 8.5 A for a period of 20 hours.
When discharging the battery		When the battery is discharged, electrical current is released, the applied voltage decreases, sulphuric acid is consumed and water is formed, the acid density decreases.
Battery test (without battery test device)		Switch on the vehicle lights and start the engine. If the light dims, the charge level of the battery is poor.
Battery test (with battery test device)		See instructions from the test device manufacturer.
When charging the battery		When the battery is charged, electrical current is stored and the applied voltage and acid density increase. Towards the end of the charge process, the battery creates large amounts of gas. Oxygen is generated at the + plate and hydrogen at the - plate, which can lead to the formation of an explosive gas. Charging areas must therefore always be well ventilated. No naked flames must be used and no sparks created
Acid density	fully charged	1.28 kg/l (frost-proof to -68°C)
	half	1.20 kg/l (frost-proof to -27°C)
	empty	1.12 kg/l (frost-proof to -10°C)
Self-discharge (approx. 1% per day)		Over a period of time, the battery discharges itself, losing its charge at a rate of approx. 1% per day even if no current is drawn (e.g. when the tractor is not being driven much). Contaminants in the battery acid (as the battery becomes older) also accelerate the battery's self-discharge process. As a result, the battery may become completely discharged after about 3-4 months if it is not used.

Technical data		
Evaporation		Particularly in the summer, evaporation causes the level of fluid in the battery to fall. This must be topped up to the acid level mark with distilled water.
When recharging with chargers		When recharging with chargers, the battery must be disconnected from the vehicle's electrical system. Unscrew the plugs. Connect the positive terminal to the positive terminal of the charger. Connect the negative terminal to the negative terminal of the charger. The charge current should be 1/10 of the battery's capacity (e.g. a 90 Ah battery should be charged with a charge current of 9 A). Grease the terminal clamps with acid-proof grease. Make sure that the ventilation holes in the vent plugs do not become blocked.
When jump-starting		When jump-starting a vehicle with a flat battery from a vehicle with a fully charged battery, connect the positive terminals and the negative terminals, and allow the engine of the vehicle with the fully charged battery to run at increased speed.

DANGER: To avoid short circuits when removing the battery:

When removing:
First disconnect the negative clamp, then the positive clamp.

When installing:
First clamp the positive cable, then the negative cable.

NOTE: *Check the charge level with the open-circuit voltage.*
Test conditions: ambient temperature approx. 27°C.

Do not charge the battery or connect to consumers six hours prior to the test. Disconnect the earth cable from the battery.

Connect the multimeter (voltmeter).

Specified values at 27°C:

12.8 VDC= **full**

12.1 to 12.25 VDC= **1/2**

11.4 to 11.8 VDC= **empty**



Fig. 344. I000749

S092 battery disconnect switch "master switch"

K068 battery disconnect relay (optional).



Fig. 345. I001139

S092 electrical master switch "battery disconnect relay"

Switch-off conditions
– Engine OFF

– Ignition OFF

NOTE: *After switching ignition OFF, wait approx. 45 seconds until the main power circuit is switched off. Otherwise the stored settings, (e.g. cruise control, Variotronic TI, etc.) will be erased.*

Switching off main power circuit
– Press S092 switch

NOTE: *If the main power circuit is switched off, no circuits except the radio, clock and interior lighting will function.*

Switching on main power circuit
– Press S092 switch

NOTE: *Do not switch on the ignition until the main power circuit has been restored, otherwise the K068 battery disconnect relay cannot close the circuit.*

K068 battery disconnect relay

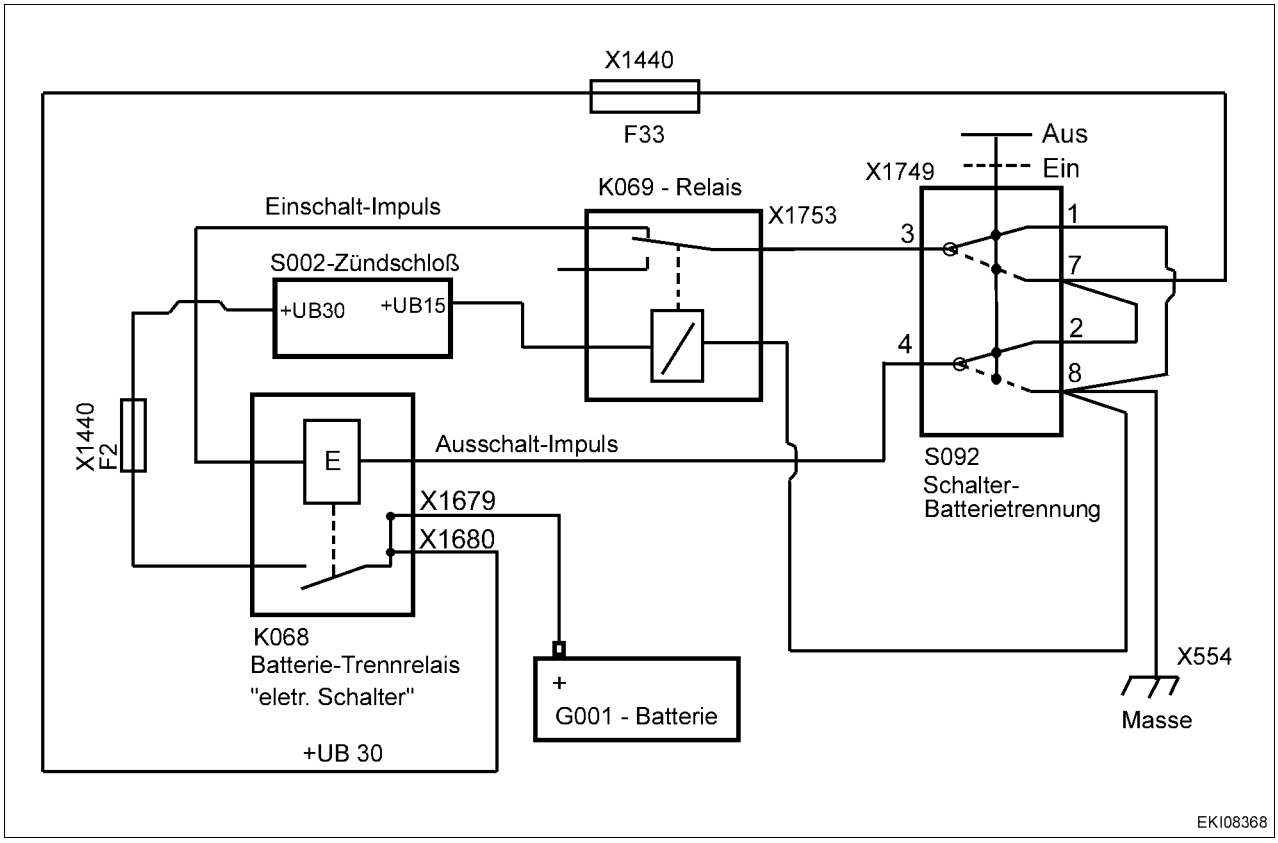


Fig. 346. I002401

Item	Designation	Note
G001	Battery	
K068	Battery disconnect relay (electric switch) **Note:** The K068 relay is a current pulse hold relay. If the K068 relay is briefly energised, the relay opens or closes and is held in this position "self-hold".	
K069	Relay (safety relay)	
S002	Ignition switch	

Item	Designation	Note
S092	Battery disconnect relay "button"	
X554	Earth pin	
X1440	Fuse holder	

Switching on main power circuit

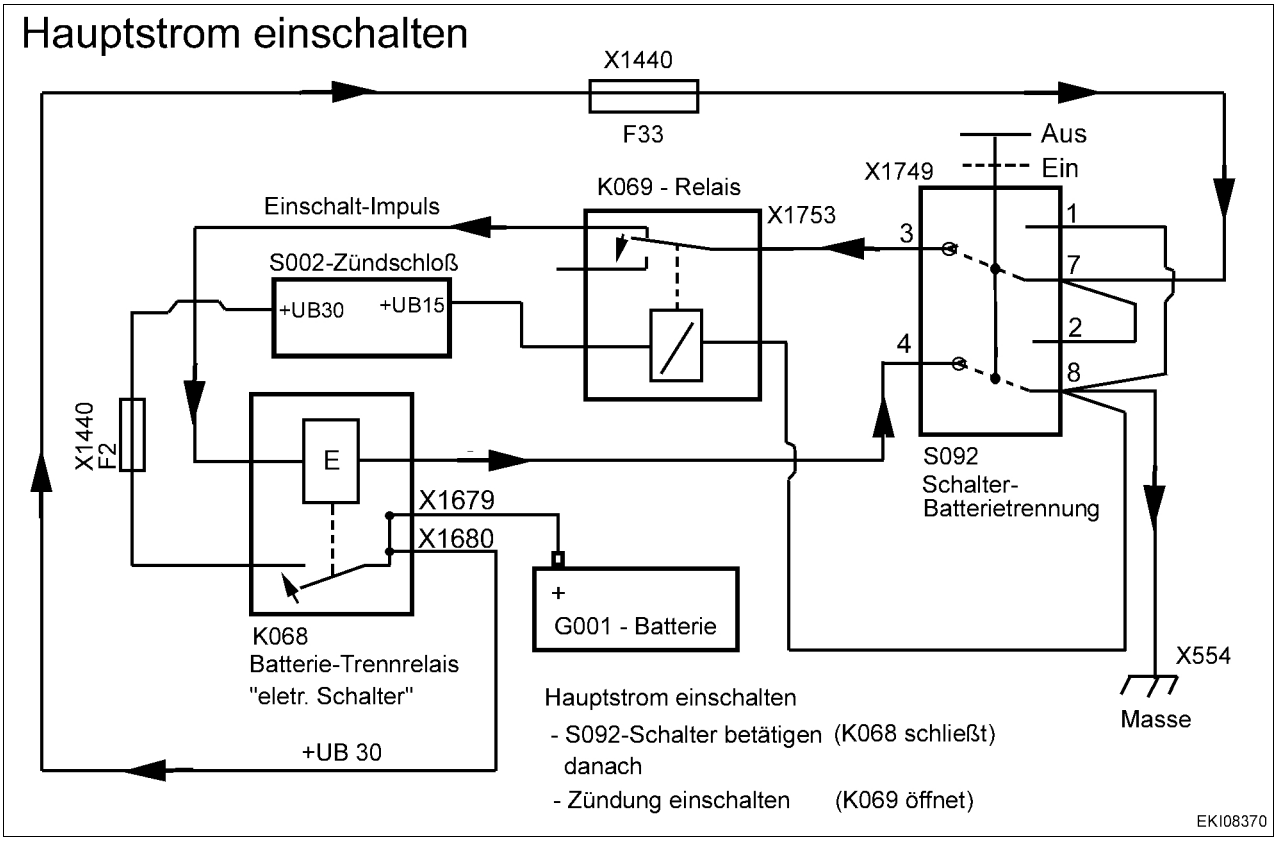


Fig. 347. I002402

Switching on main power circuit:

– Actuate S092 switch "button"

– Battery voltage goes to the "Switch-on pin" of the K068 battery disconnect relay

– The K068 battery disconnect relay closes and goes to self-hold

– Switch on the ignition at S002 ignition switch

– K069 relay opens
(The K069 relay prevents the vehicle electrical system from failing if the S092 switch is actuated inadvertently while driving; "Safety relay".)

Switching off main power current

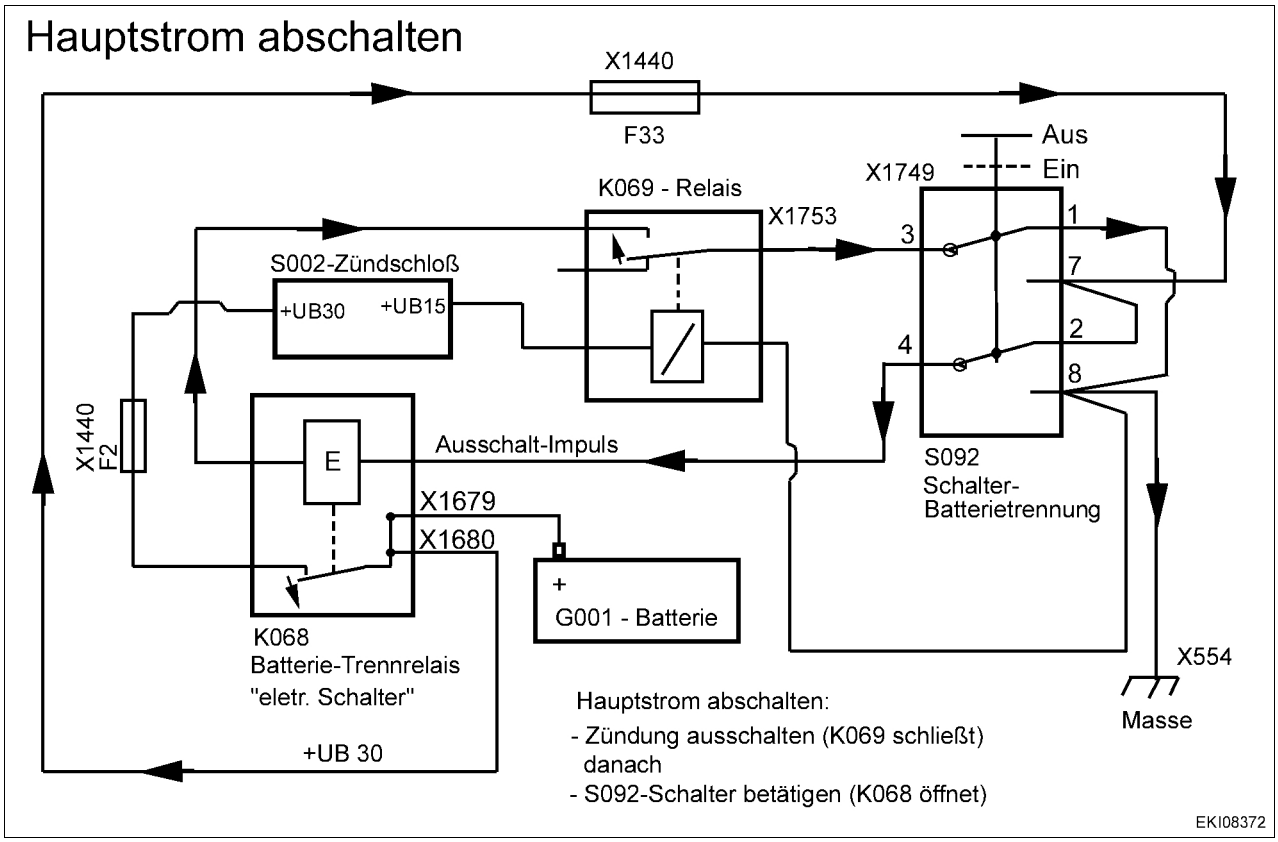


Fig. 348. I002403

Switching off main power current

– Switch off the ignition at S002 ignition switch
– K069 relay "safety relay" closes
– Actuate S092 switch "button"
– Battery voltage goes to the "Switch-off pin" of the K068 battery disconnect relay
– The K068 battery disconnect relay opens and goes to self-hold.
– If the main power circuit is switched off, no circuits except the radio, clock and interior lighting will function.

89 G002 / G004 alternator right/left

Circuit diagram: G002/G004 alternator

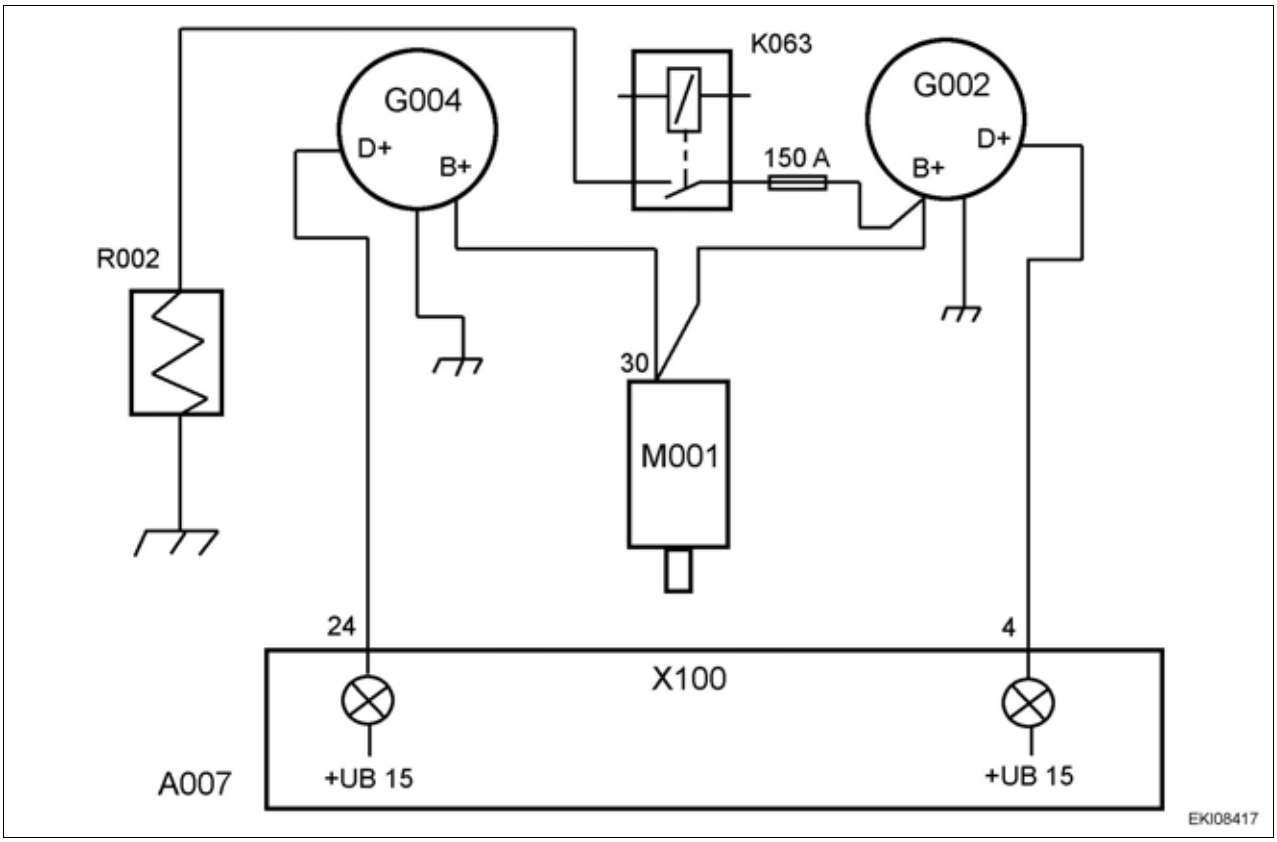


Fig. 349. I002397

Item	Designation	Note
A007 - Instrument panel		
X100	"Blue" separation point on A007	
Pin 4	Charging indicator on G002 alternator (right side)	
Pin 24	Charging indicator on G004 alternator (left side)	
G002/G004 alternator (left/right)		
B+	Battery +	
D+	Dynamo +	
M001 starter		
30	Terminal 30 (battery +)	
K063	Heater flange relay	Is actuated by A051 ECU, engine control unit.
R002	Heater flange	
150 A	150 A fuse	

NOTE: *The G002/G004 alternator (three-phase alternator) must not be operated unless a battery or another consumer (e.g. vehicle lighting) is connected, otherwise the rectifier or governor may be damaged.*

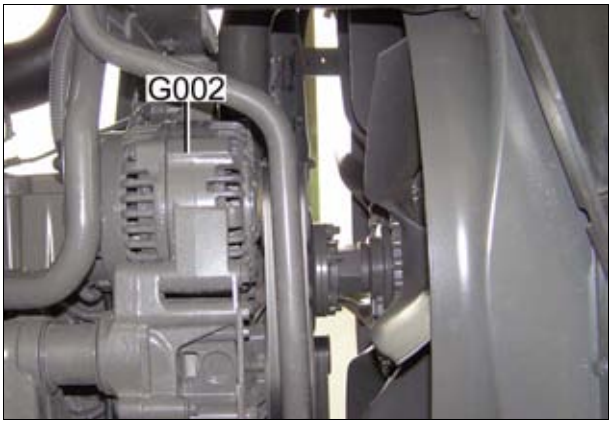


Fig. 350. I001105

Check regulating voltage (B+):

Measure B+ (rt 16) at G002 and G004 alternator and earth.

	Voltage (VDC)
Ignition OFF	12 VDC
Ignition ON.	12 VDC
Engine is running	Approx. 14 VDC

In the event of deviations, have G002 or G004 alternator repaired by a specialist workshop.

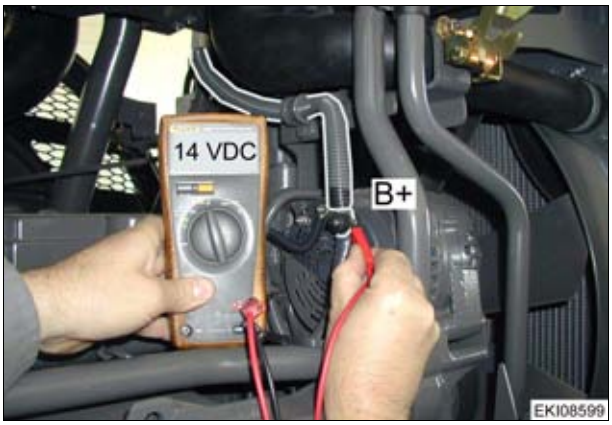


Fig. 351. I002398

Check excitation voltage at D+:
Measure D+ at G002 and G004 alternator and earth.

	Voltage (VDC)
Ignition OFF	0 VDC
Ignition ON.	Approx. 1.5 VDC
Engine is running	Approx. 14 VDC

In the event of deviations, have G002 or G004 alternator repaired by a specialist workshop.



Fig. 352. I002399

Measure current at the alternator

	Current (ADC)
Lighting and work lights on (for each alternator)	Approx. 80 ADC (depending on charge level of G001 battery)
Maxim current (for each alternator)	150 ADC

In the event of deviations, have G002 or G004 alternator repaired by a specialist workshop.



Fig. 353. I002400

Possible cause of fault

G001 - Battery 1 is not charged or is insufficiently charged	
V-belt too loose	Tighten V-belt
Break or contact resistance in the charging circuit	Repair break or contact resistance in the charging circuit
G001 - Battery 1 damaged	Check the **G001** - Battery 1 with a test device; replace the **G001** - Battery 1 if necessary.
G002/G004 alternator damaged	Check G002/G004 alternator charging voltage. If necessary, have it repaired at a specialist workshop.

Charging indicator lamp does not light up when the vehicle is stationary and the ignition switched on	
G001 - Battery 1 discharged	Charge **G001** - Battery 1 the using the charger
G001 - Battery 1 damaged	Check the **G001** - Battery 1 with a test device; replace the **G001** - Battery 1 if necessary.
Electrical wiring loose or damaged	Replace electrical wiring, tighten connections
Indicator lamp (LED) faulty	Replace the **A007** - Instrument panel
Regulator damaged	Have the G002/G004 alternator repaired in a specialist workshop
Short circuit of a plus diode in the G002/G004 alternator	Have the G002/G004 alternator repaired in a specialist workshop
Carbon brushes worn out	Have the G002/G004 alternator repaired in a specialist workshop
Oxidation layer on slip rings, break in the rotor winding	Have the G002/G004 alternator repaired in a specialist workshop

Charging indicator is consistently bright at high speed	
D+ wire is connected to earth	Replace wire or rectify the earth connection
Regulator damaged	Have the G002/G004 alternator repaired in a specialist workshop
Overvoltage protection damaged	Have the G002/G004 alternator repaired in a specialist workshop
Rectifier damaged, slip rings dirty, short in DF wire or rotor winding	Have the G002/G004 alternator repaired in a specialist workshop

When the engine is at rest the charging indicator lamp is lit, but is less bright or dims when the engine is running	
Contact resistors in the charging circuit or in the wiring to the charging indicator lamp	Rectify the contact resistors
Regulator damaged	Have the G002/G004 alternator repaired in a specialist workshop
G002/G004 alternator damaged	Have the G002/G004 alternator repaired in a specialist workshop

Charging indicator lamp flickers	
Regulator damaged	Have the G002/G004 alternator repaired in a specialist workshop

NOTE: *see §16*

90 M001 starter

Actuation of **M001** - starter.

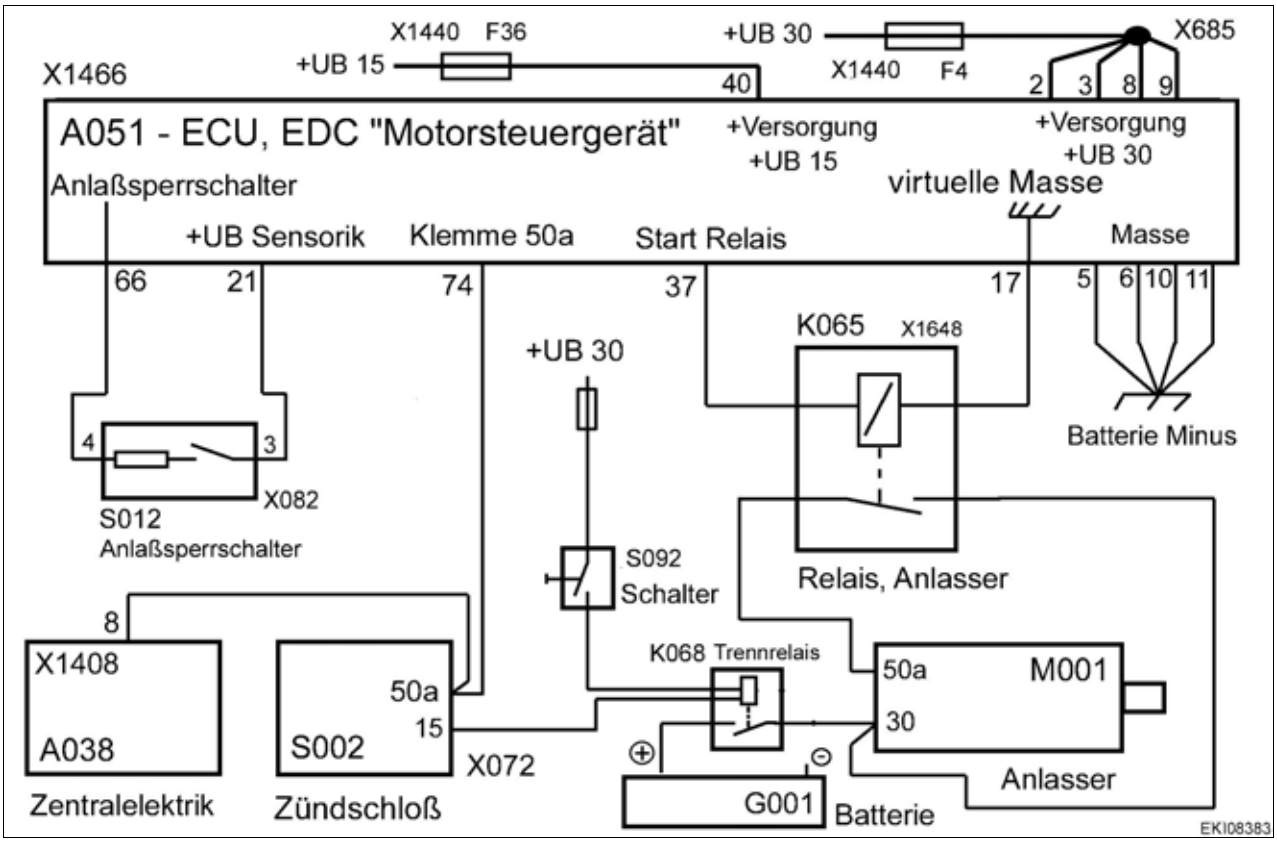


Fig. 354. I002393

Item	Designation	Note
A051 - ECU, engine control unit (EDC 7). **(X1466 separation point)**		
Pin 2, 3, 8, 9	+ supply (+ UB 30)	
Pin 40	+ supply (+ UB 15)	Ignition ON.
Pin 5, 6, 10, 11	Earth	
Pin 21	+UB sensor system (12 VDC)	Ignition ON.
Pin 66	Starter lockout switch	Operate clutch (switch closed)
Pin 74	Terminal 50a	Voltage is applied to terminal 74 during the start process (50a). Consumers with high power consumption (e.g. work lights) are switched off.
Pin 37	+UB (switchover voltage at K065 starter relay)	
Pin 17	Virtual earth (earth at K065 starter relay)	
G001	Battery	
K065	Starter relay (X1648 separation point)	
K068	Battery disconnect relay (optional)	See also:*see §88*
M001	Starter	
S002	Ignition switch	

Item	Designation	Note
S012	Starter lockout switch (X082 separation point)	
S092	Switch for the battery disconnect relay	See also: *see §88*
X1440	Fuse holder	

Checking voltage and power consumption at **M001** - starter.

Pin	Function
30	Input directly from battery+
50	Starter control

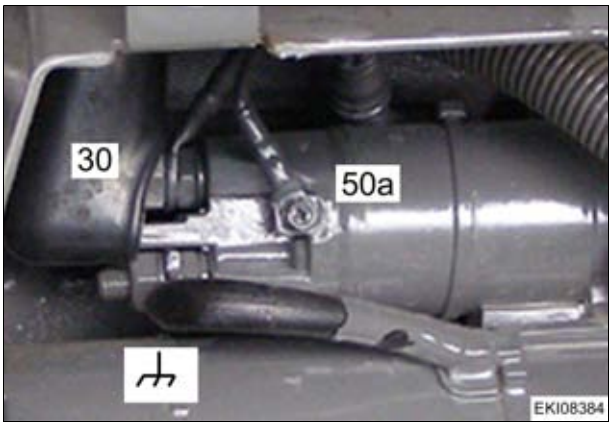


Fig. 355. I001651

For coolant temperature below 5°C

Disconnect **K063** - Heater flange relay

At a coolant temperature below 5°C, the A051 ECU, EDC "engine control unit" switches on the **R002** - Heater flange via the **K063** - Heater flange relay, thereby reducing the +UB30 battery voltage.



On top of engine, on thermostat housing.

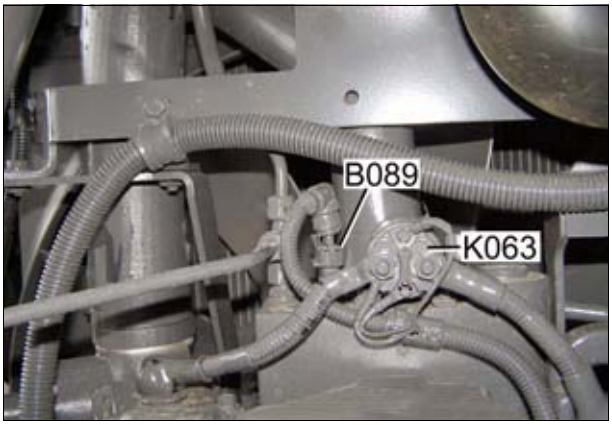


Fig. 356. I001611

Circuit diagram of K063 - Heater flange relay

NOTE: *Inductive resistance = 20 ohms +/- 10%*

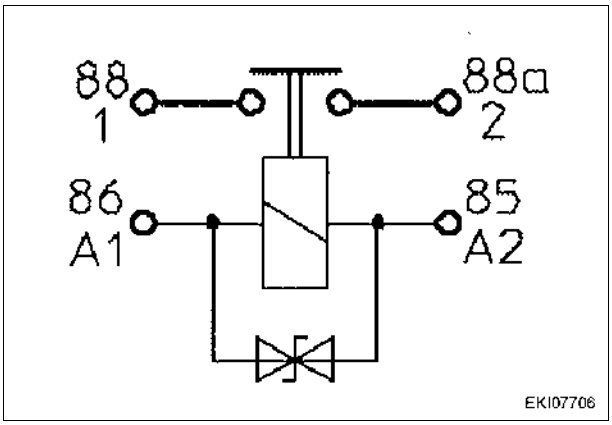


Fig. 357. I000767

Unscrew terminal 85.

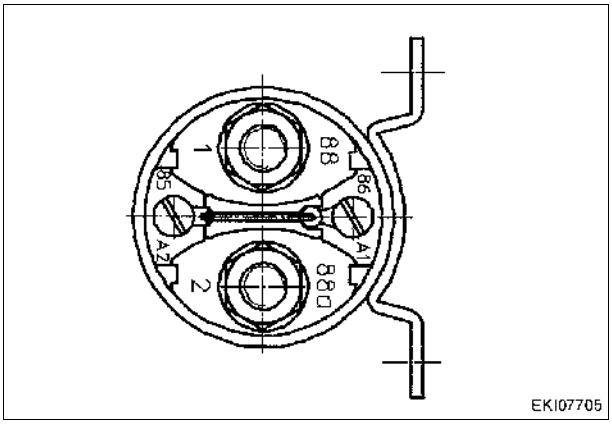


Fig. 358. I000768

Disconnect the **X1671** - Separation point on A051 (prevents the engine from starting)

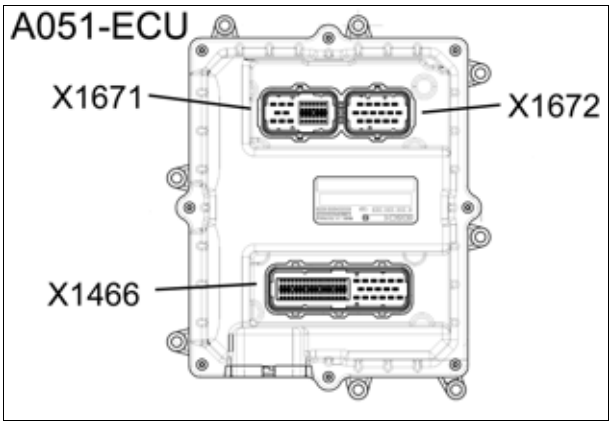


Fig. 359. I000621

Check voltage drop during startup

Operate the **M001** - starter.

Measure the voltage at pin 30 of the **M001** - starter. and the vehicle earth with a voltmeter.

Specified value: approx. 9.5 VDC

NOTE: *The **M001** - starter. turns for approx. 5 seconds, then the **A051** - ECU, engine control unit (EDC 7). interrupts the starter current*



Fig. 360. I002394

Check M001 - starter. power input

Check the power consumption on the wire (UB 30) using a current clamp or an ampere meter.

Specified value: approx. 600 ADC

NOTE: *The **M001** - starter. turns for approx. 5 seconds, then the **A051** - ECU, engine control unit (EDC 7). interrupts the starter current*



Fig. 361. I002395

NOTE: *The target value of approx. 9.5 VDC/600 A is dependent on the charge level of the battery and the temperature (outdoor temperature and/or engine temperature). Low temperatures lead to an increase in the power consumption of the **M001** - starter..*
If the actual value falls below this approximate value, there is a fault in the battery and/or supply wires (positive and earth).

Where necessary:

Connect the **K063** - Heater flange relay.

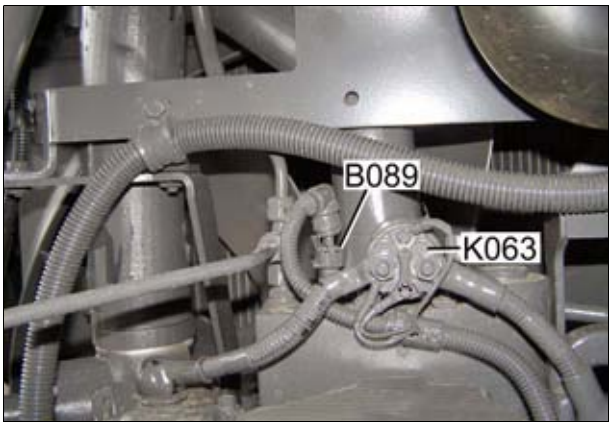


Fig. 362. I001611

When screwing in the terminals, note:

Thread M8 = 12 to 13 Nm

Thread M3.5 = 1.1 … 1,2 Nm

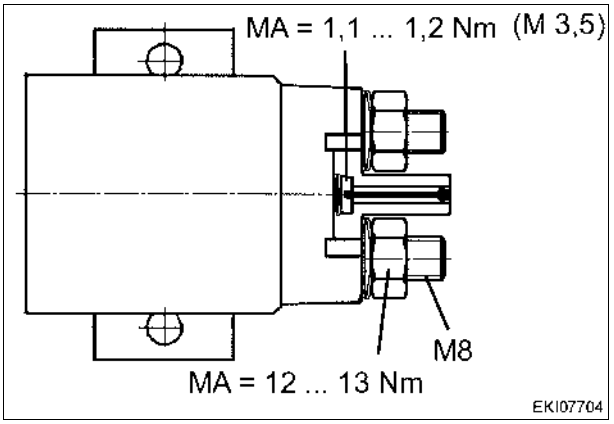


Fig. 363. I000769

After completing the measurement

Connect the **X1671** - Separation point on A051.

Delete existing error code on the A007 - Instrument panel (FENDIAS diagnostic system).

Delete existing error code in A051 ECU, engine control unit (Deutz Serdia diagnostics).

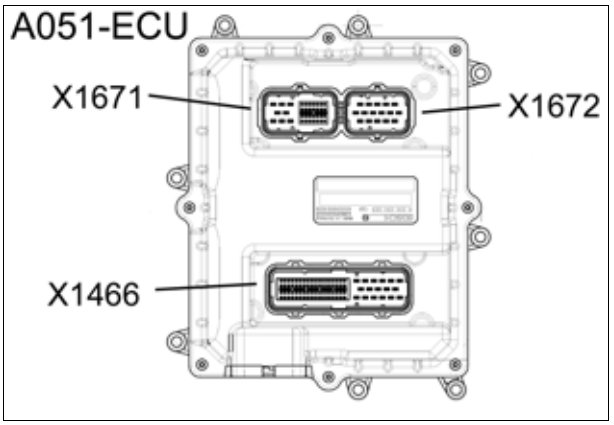


Fig. 364. I000621

NOTE: *see §13*
see §14

91 M002 front wiper motor

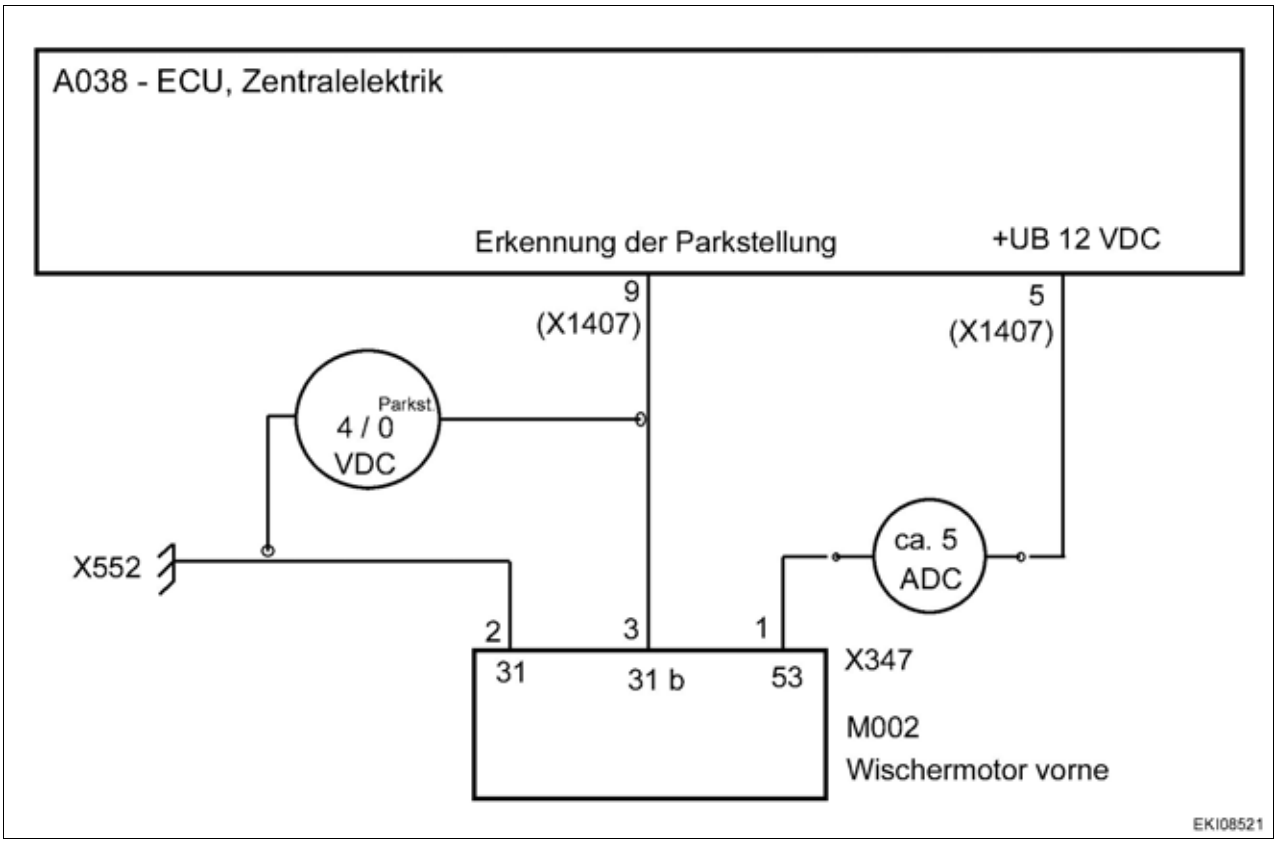


Fig. 365. I002225

Item	Designation	Note
A038 - ECU, central electrical system		
X1407	Separation point on A038	
Pin 5 (X1407)	+ supply (53) to M002 front wiper motor	
Pin 9 (X1407)	Control line (31b) from M002 wiper motor to A038 ECU, central electrical system	**The A038 ECU, central electrical system recognises the park position of the M002 wiper motor by the signal on the control line (31b).** Once the M002 wiper motor reaches the park position, the voltage (approx. 4 VDC) is switched to earth. The voltage (approx. 4 VDC) on the control line (31b) falls to 0 VDC. The A038 ECU, central electrical system recognises that the park position has been reached and switches the M002 wiper motor off. **Note:** If the control line (31b) is interrupted, the A038 ECU, central electrical system does not switch off the M002 wiper motor.
M002 - Front wiper motor		
X347	Separation point on **M002** - Front wiper motor	
Pin 1	+supply (53)	
Pin 2	Earth (31)	
Pin 3	Control line (31b)	

Measuring points and signal values

M002 - Front wiper motor X347 separation point	
Pin	**Function**
1	+supply (53)
2	Earth (31)
3	Control line (31b)



Fig. 366. I001144

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see §16*

Prerequisite for this measurement:

– Use the **vehicle earth** to **earth**

Measuring +supply and signal voltage
NOTE: *All readings +/- 10%.*

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	D5 (X1407)			
		0 VDC	Ignition OFF	
		12 VDC	Ignition ON.	
		Approx. 5 ADC	Using multimeter (ampere meter), open and measure pin 5.	
Vehicle earth				
Control line (detection of the park position)	D9 (X1407)			
		0 VDC	Ignition ON, Wiper motor OFF	
		approx. 4.0 VDC	Ignition ON, Wiper motor ON	
Earth	1			

NOTE: *see §11*

Voltage curve on the control line (pin D9 on X1407)
Once the **M002** - Front wiper motor reaches the park position, the voltage (approx. 4 VDC) is switched to earth.
The voltage (approx. 4 VDC) on the control line (31b) falls to 0 VDC.
The **A038** - ECU, central electrical system recognises that the park position has been reached and switches the **M002** - Front wiper motor off.

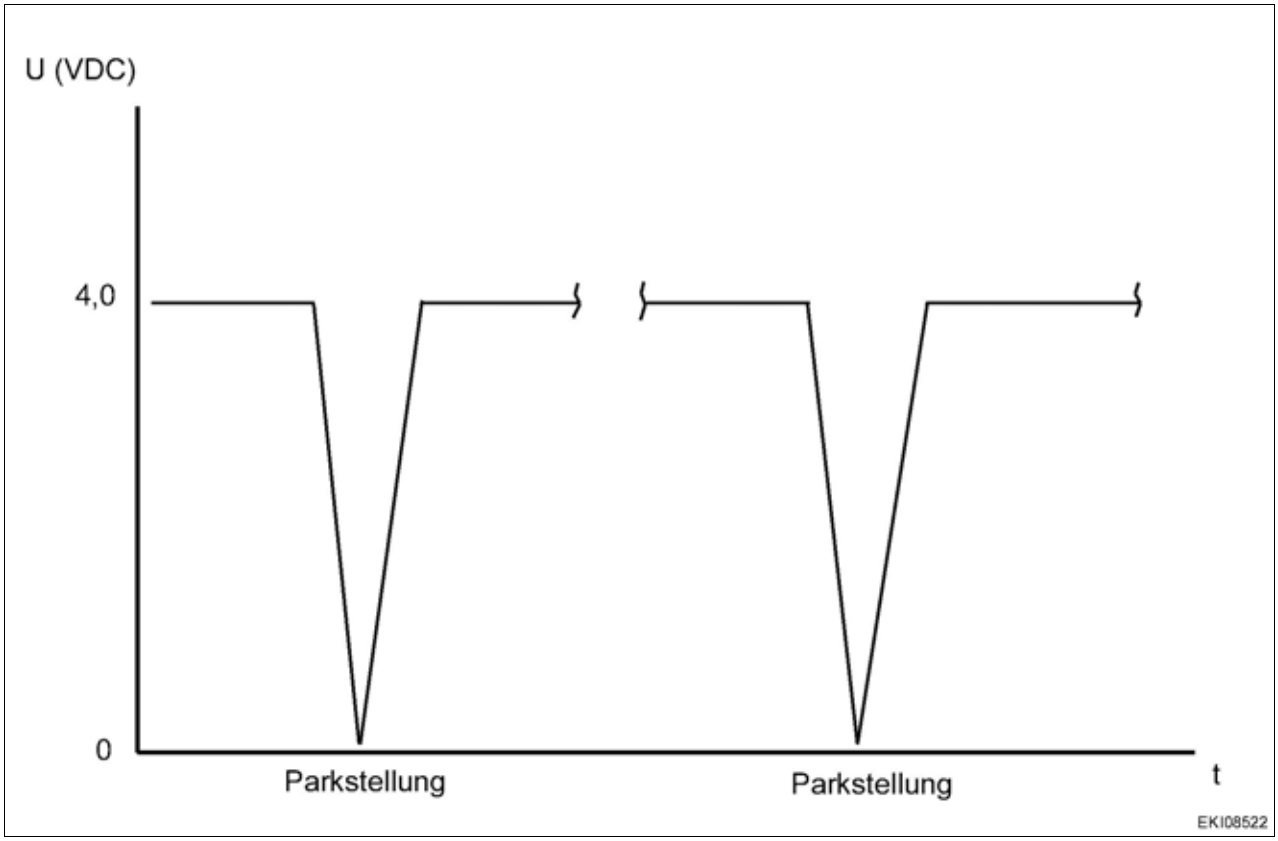


Fig. 367. I002230

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92 M003 / M005 front/rear wiper pump

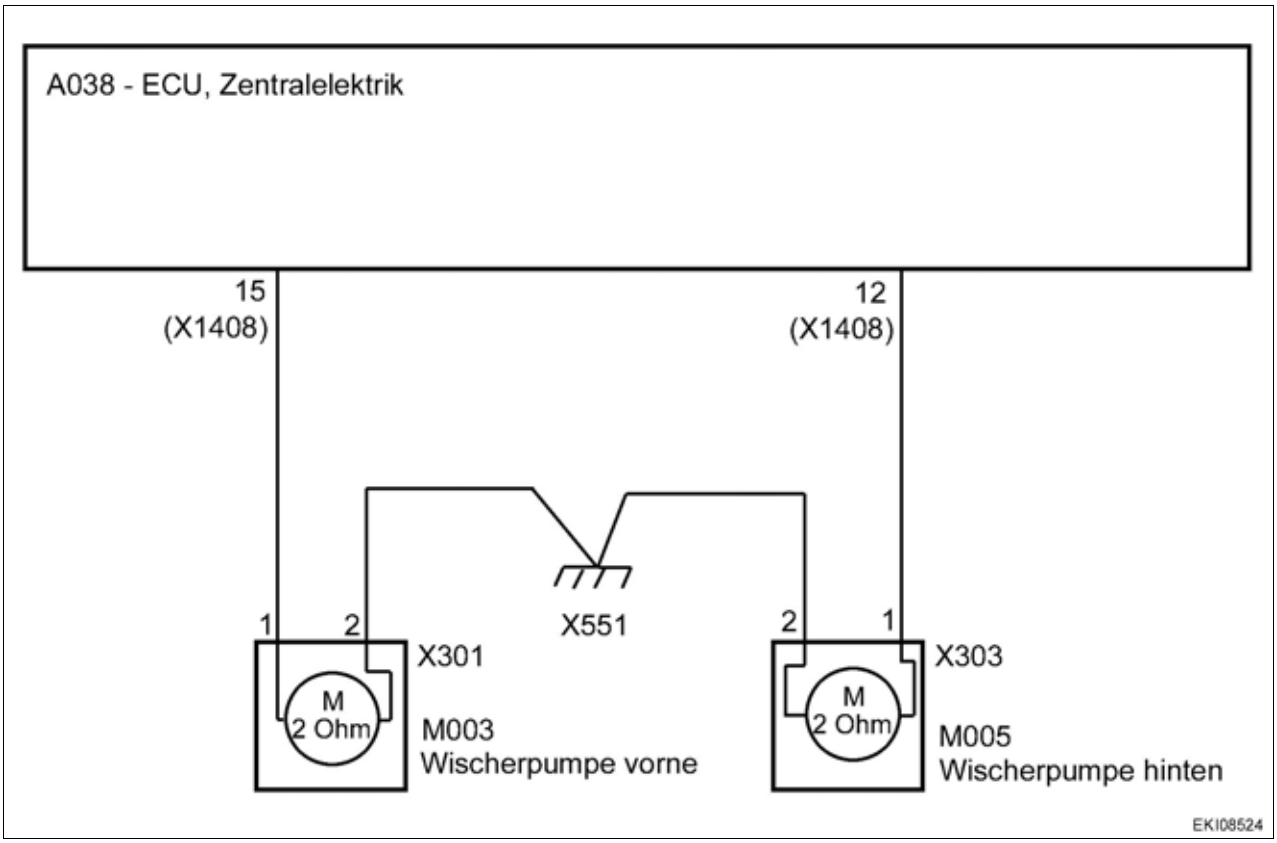


Fig. 368. I002246

Item	Designation	Note
A038 - ECU, central electrical system		
X1408	Separation point on A038	
Pin 12 (X1408)	Activation of **M005** - Wiper pump, rear	
Pin 15 (X1408)	Activation of **M003** - Wiper pump, front	
M003 - Wiper pump, front		
X301	Separation point on **M003** - Wiper pump, front	
Pin 1	Actuation	
Pin 2	Earth	
M005 - Wiper pump, rear		
X303	Separation point on **M005** - Wiper pump, rear	
Pin 1	Actuation	
Pin 2	Earth	

Measuring points and signal values

M003/M005 wiper pump X301 separation point on the M003 - Wiper pump, front X303 separation point on the M005 - Wiper pump, rear	
Pin	**Function**
1	Actuation
2	Earth



Fig. 369. I001147

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Measure pins.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 2.0 ohms	20 °C Coil resistance	
Earth	2			

Measuring voltage (V)

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see §16*

Prerequisite for this measurement:

– Use the **vehicle earth** to **earth**

M003 wiper pump, front				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
Actuation	E15 (X1408)	0 VDC	Wiper pump not operated	
		12 VDC	Wiper pump operated	
Vehicle earth				

M005 wiper pump, rear				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
Actuation	E12 (X1408)	0 VDC	Wiper pump not operated	
		12 VDC	Wiper pump operated	
Vehicle earth				

NOTE: *All readings +/- 10%.*
see §11

93 M004 wiper motor, rear

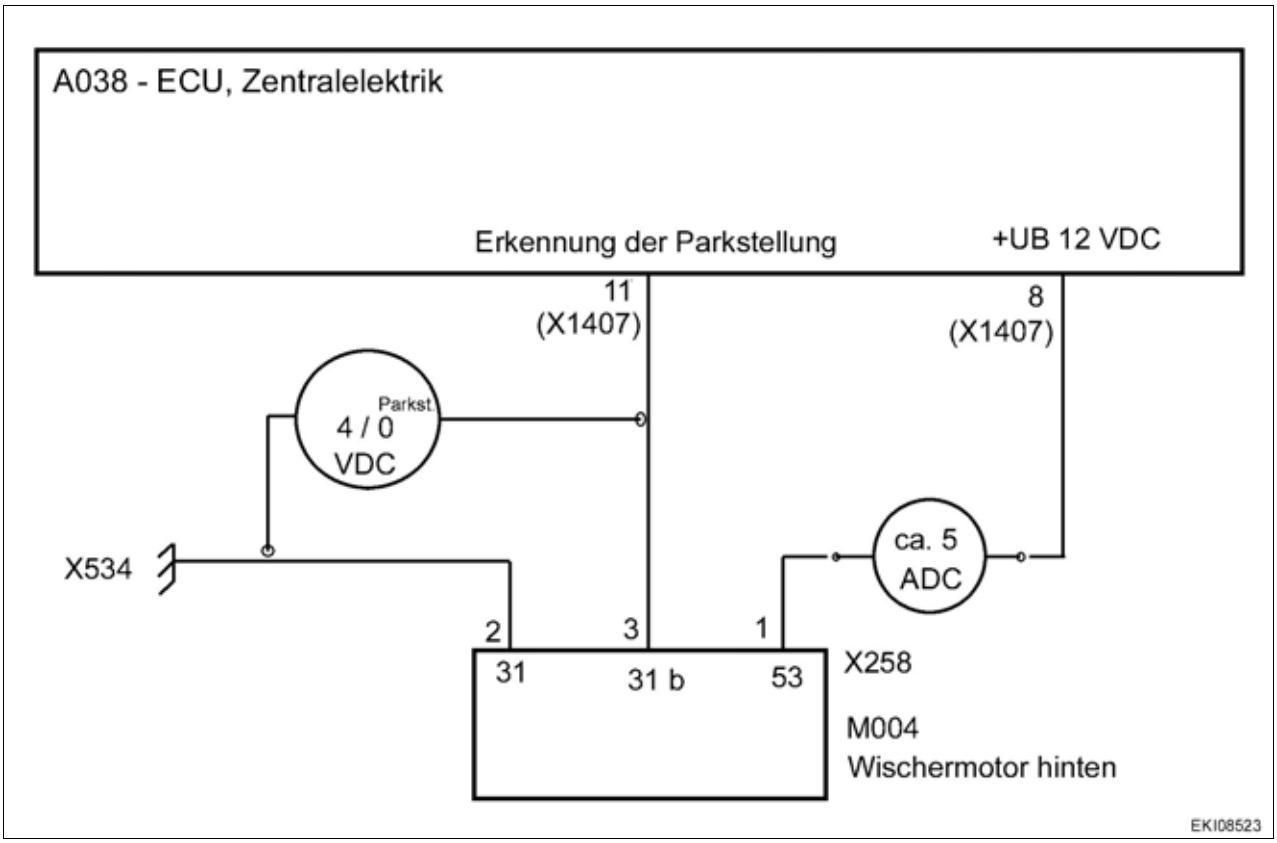


Fig. 370. I002233

Item	Designation	Note
A038 - ECU, central electrical system		
X1407	Separation point on A038	
Pin 8 (X1407)	+supply (53) to M004 rear wiper motor	
Pin 11 (X1407)	Control line (31b) from M004 wiper motor to A038 ECU, central electrical system	**The A038 ECU, central electrical system recognises the park position of the M004 wiper motor by the signal on the control line (31b).** Once the M004 wiper motor reaches the park position, the voltage (approx. 4 VDC) is switched to earth. The voltage (approx. 4 VDC) on the control line (31b) falls to 0 VDC. The A038 ECU, central electrical system recognises that the park position has been reached and switches the M004 wiper motor off. **Note:** If the control line (31b) is interrupted, the A038 ECU, central electrical system does not switch off the M004 wiper motor.
M004 - Rear wiper motor		
X258	Separation point on M004 wiper motor	
Pin 1	+supply (53)	
Pin 2	Earth (31)	
Pin 3	Control line (31b)	

Measuring points and signal values

M004 - Rear wiper motor X258 separation point	
Pin	**Function**
1	+supply (53)
2	Earth (31)
3	Control line (31b)



Fig. 371. I001146

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see §16*

Prerequisite for this measurement:

– Use the **vehicle earth** to **earth**

Measuring +supply and signal voltage

NOTE: *All readings +/- 10%.*

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	D8 (X1407)			
		0 VDC	Ignition OFF	
		12 VDC	Ignition ON.	
		Approx. 5 ADC	Using multimeter (ampere meter), open and measure pin 5.	
Vehicle earth				
Control line (detection of the park position)	D11 (X1407)			
		0 VDC	Ignition ON, Wiper motor OFF	
		approx. 4.0 VDC	Ignition ON, Wiper motor ON	
Vehicle earth	1			

NOTE: *see §11*

Voltage curve on the control line (pin 11 on X1407)

Once the **M004** - Rear wiper motor reaches the park position, the voltage (approx. 4 VDC) is switched to earth.
The voltage (approx. 4 VDC) on the control line (31b) falls to 0 VDC.
The **A038** - ECU, central electrical system recognises that the park position has been reached and switches the **M004** - Rear wiper motor off.

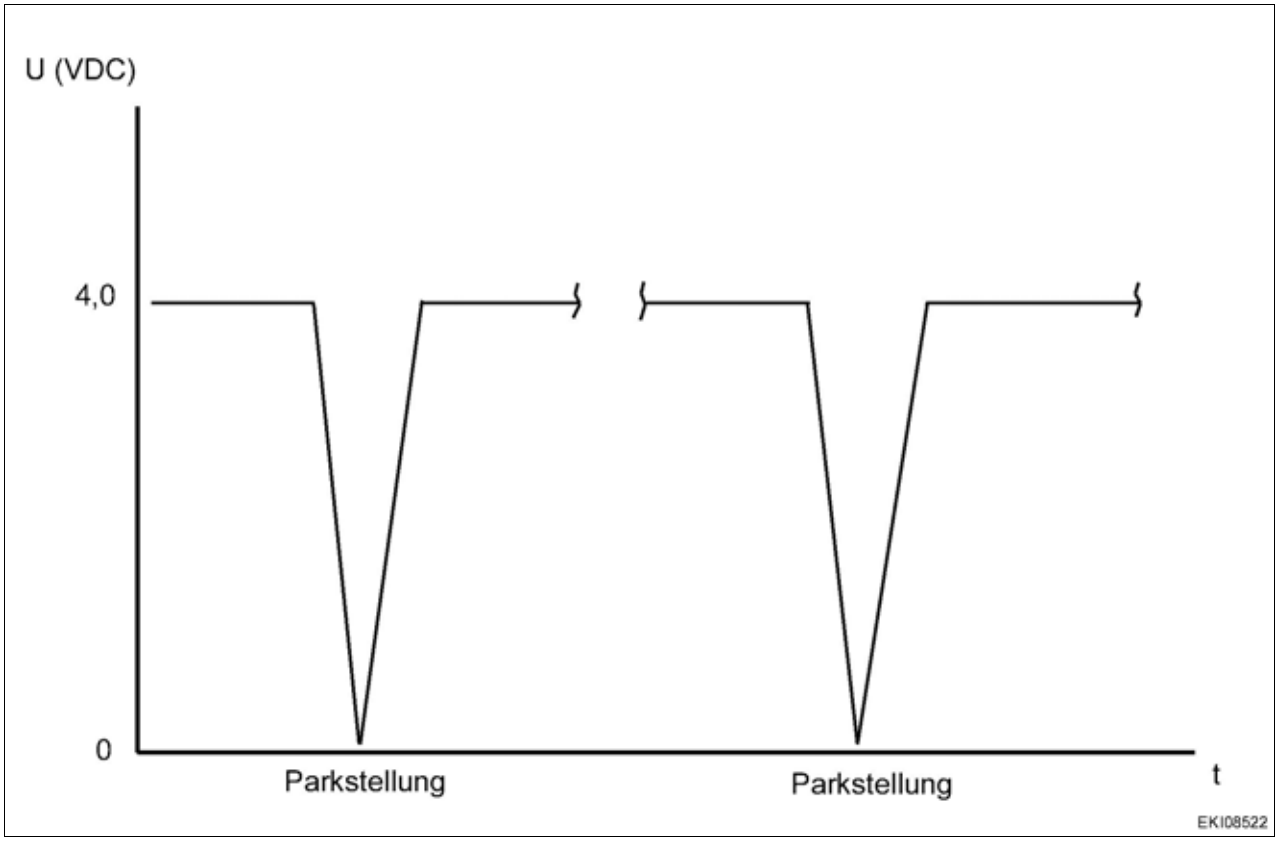


Fig. 372. I002230

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94 M010 fuel pump

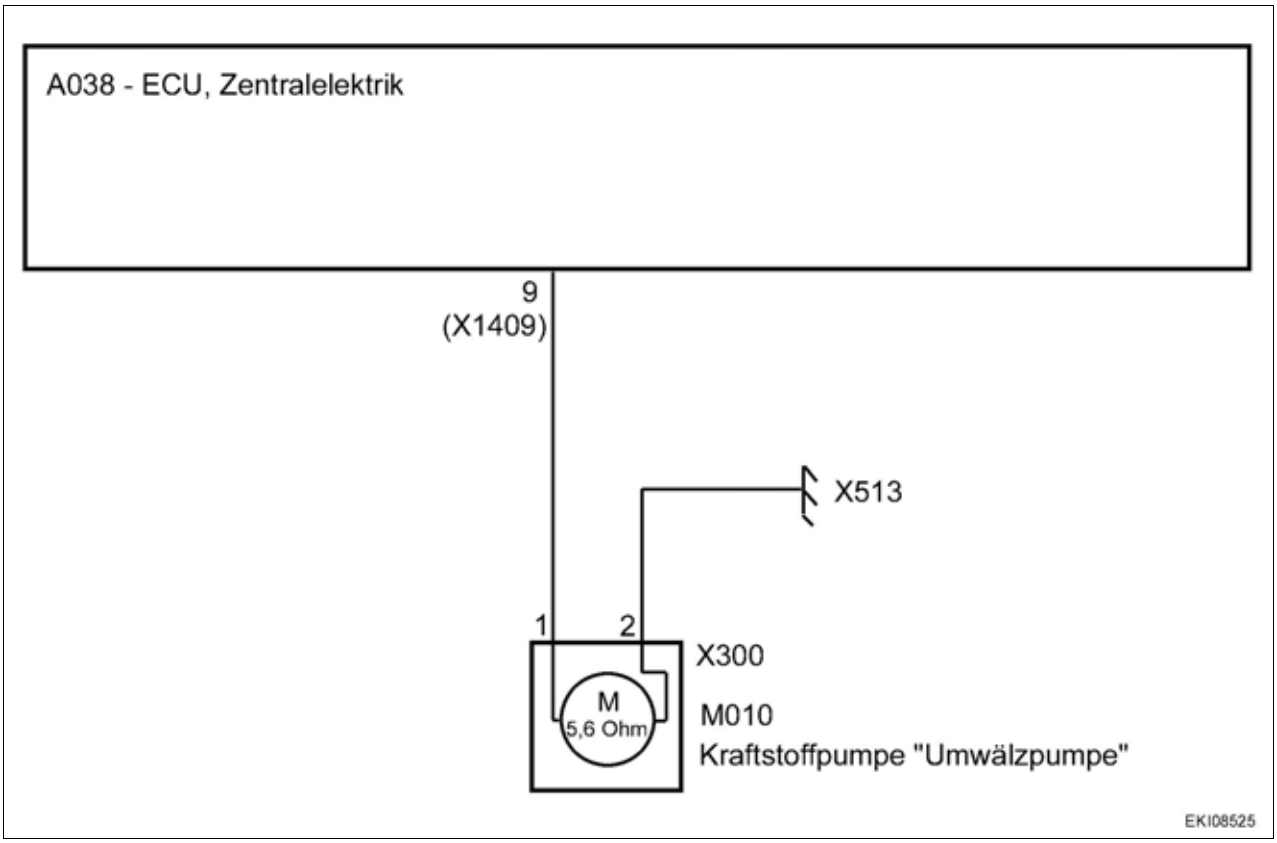


Fig. 373. I002253

Item	Designation	Note
A038 - ECU, central electrical system		
X1409	Separation point on A038	
Pin 9 (X1409)	Activation of **M010** - Fuel pump	
M010 - Fuel pump		
X300	Separation point on **M010** - Fuel pump	
Pin 1	Actuation	
Pin 2	Earth	

Measuring points and signal values

M010 - Fuel pump X300 separation point on M010 - Fuel pump	
Pin	**Function**
1	Actuation
2	Earth

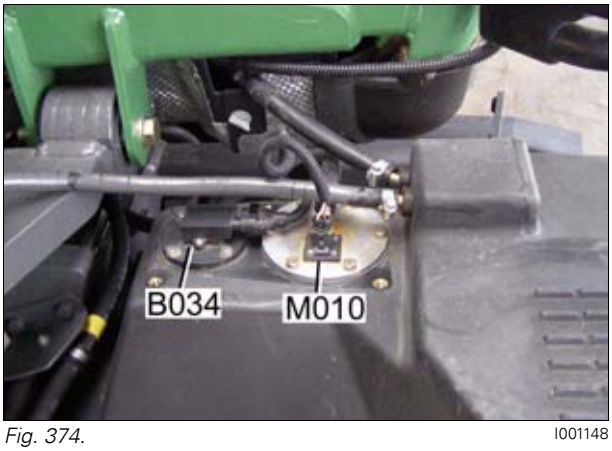


Fig. 374. I001148

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Connect the adapter cable X899.980.246.204 directly to the component (plug adapter cable into the component only).
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 5.6 ohms	20 °C Coil resistance	
Earth	2			

Measuring power consumption (A) and voltage (V)

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see §16*

Prerequisite for this measurement:

– Use the **vehicle earth** to **earth**

Measuring the voltage (VDC)				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
Actuation	F9 (X1409)	0 VDC	Fuel pump OFF	
		14 VDC	– Engine running – Fuel tank display (on A007 instrument panel) showing fewer than 4 bars Fuel pump ON	
Vehicle earth				

Measuring the power consumption (ADC)				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
Actuation	F9 (X1409)	0 ADC	Fuel pump OFF	
		Approx. 0.72 ADC	– Engine running – Fuel tank display (on A007 instrument panel) showing fewer than 4 bars Fuel pump ON	

NOTE: *see §11*

The M010 - Fuel pump switches on, if:

– **B010** - Sensor, engine speed shows a speed and
see §49

– **B034** - Immersed tube sensor (fuel) on the **A007** - Instrument panel shows fewer than 4 bars.
Apply a resistance of **140 ohms** at B034 immersed tube sensor.
see §60

NOTE: *If the fuel level is too low (lower than approx. 20 ohms) the M010 fuel pump switches off. This prevents the M010 fuel pump from drawing air.*

NOTE: *All readings +/- 10%.*

95 M017 primary fan

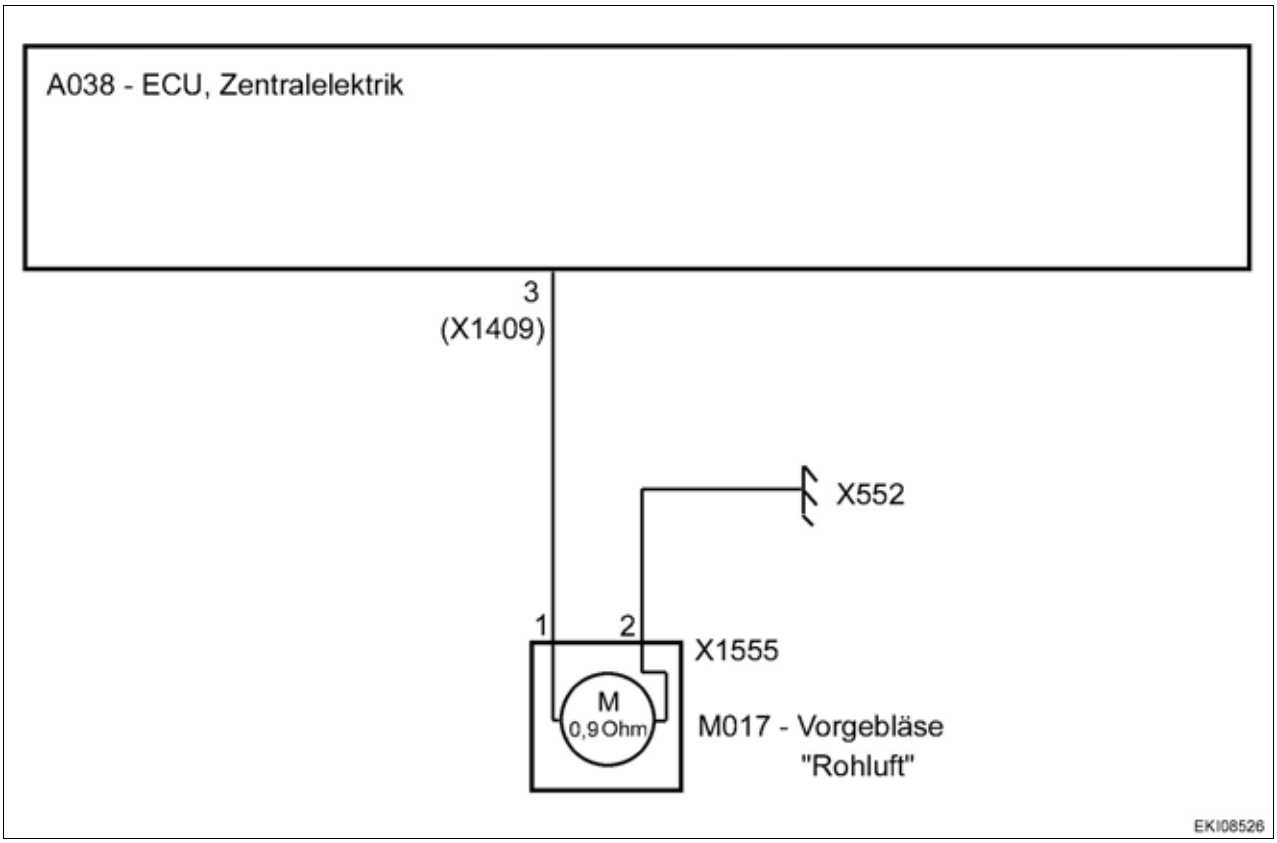


Fig. 375. I002261

Item	Designation	Note
A038 - ECU, central electrical system		
X1409	Separation point on A038	
Pin 3 (on X1409)	Activation of **M017** - Primary fan	
M017 - Primary fan		
X1555	Separation point on **M017** - Primary fan	
Pin 1	Actuation	
Pin 2	Earth	

Measuring points and signal values

M017 - Primary fan X1555 separation point	
Pin	**Function**
1	Actuation
2	Earth



Fig. 376. I001149

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
*Measure pins on **M017** - Primary fan*
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 0.9 ohms	20 °C Coil resistance	
Earth	2			

Measuring power consumption (A) and voltage (V)

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see §16*

Prerequisite for this measurement:

– Use the **vehicle earth** to **earth**

Measuring the voltage (VDC)				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
Actuation	F3 (X1409)	0 VDC	Ignition OFF, M017 primary fan off	
		14 VDC	Ignition ON, Start the diesel engine, M017 primary fan running.	
Vehicle earth				

Measuring the power consumption (ADC)				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
Actuation	F3 (X1409)	0 ADC	Ignition OFF, M017 primary fan off	
		Approx. 14 ADC	Ignition ON, Start the diesel engine, M017 primary fan running.	

NOTE: *see §12*

NOTE: *All readings +/- 10%.*

96 R002 heater flange

G004 alternator
K063 heater flange relay
R002 heater flange
150 A fuse (150 ampere)



Front of engine

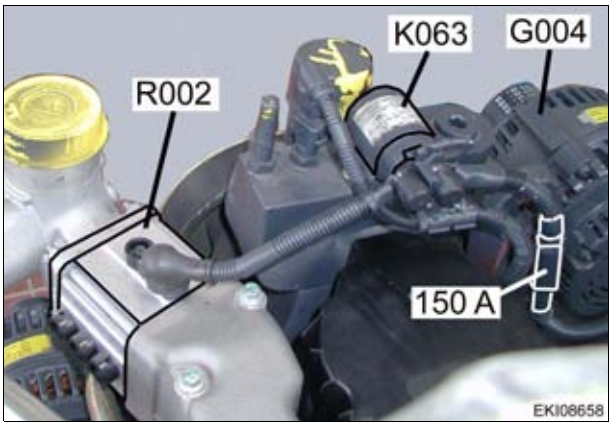


Fig. 377. I002531

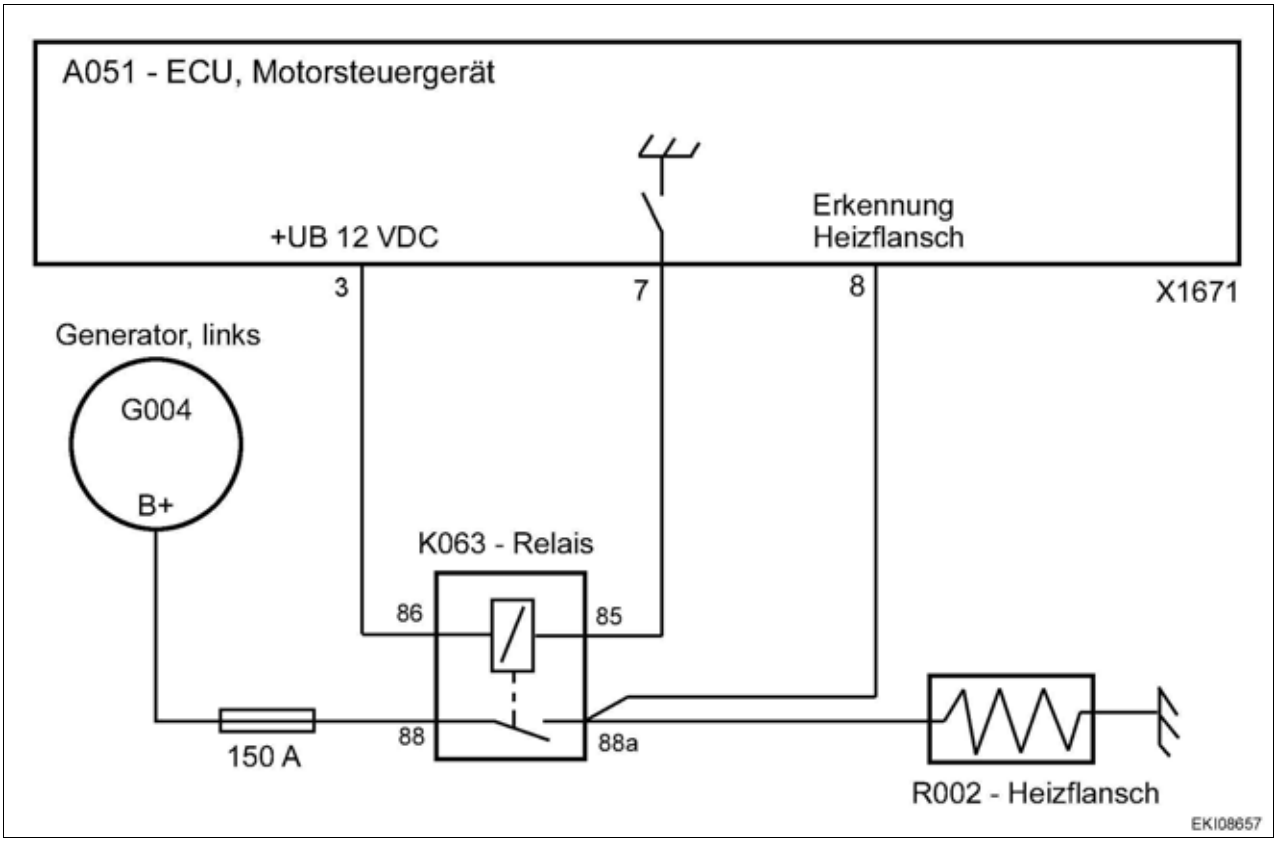


Fig. 378. I002530

Item	Designation	Note
A051 - ECU, engine control unit (EDC 7).		
X1671	Separation point on A051	
3	+UB 12 VDC	
7	Switch on heater flange	
8	Detection of heater flange	
G004	Alternator (B+)	
K063	Heater flange relay	
R002	Heater flange	

Function of R002 heater flange

The R002 heater flange switches at a coolant temperature below 5°C.

At a coolant temperature below 5°C, the A051 ECU, EDC "engine control unit" switches on the **R002** - Heater flange via the **K063** - Heater flange relay, allowing the inlet air to be pre-heated.
The **R002** - Heater flange is energised for approx. 1 minute



On top of engine, on thermostat housing.

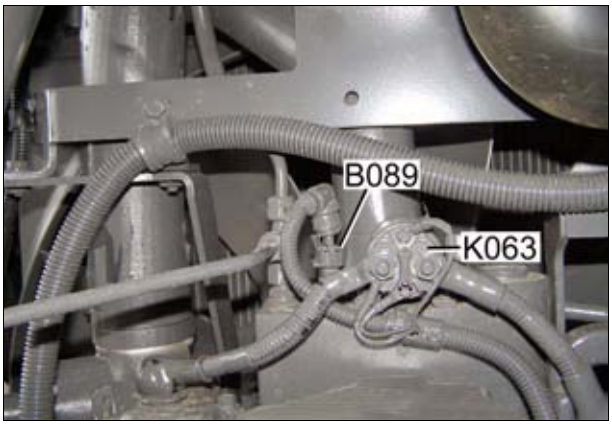


Fig. 379. I001611



Pre-heater indicator

When starting at temperatures below 5°C.
wait until the indicator lamp is extinguished.



Fig. 380. I001023

Checking the K063 heater flange relay

Circuit diagram of K063 - Heater flange relay

NOTE: *Inductive resistance = 20 ohms +/- 10%*

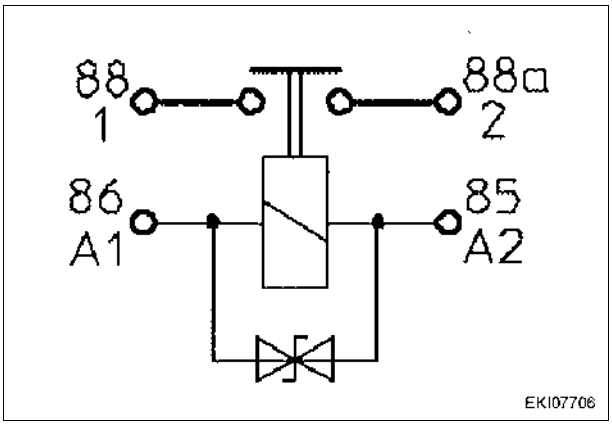


Fig. 381. I000767

Pin	Function
86	Inductive input
85	Inductive output
88	Pin entry
88a	Pin output

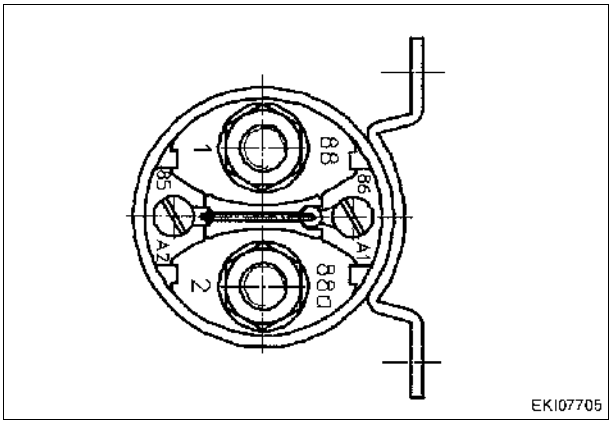


Fig. 382. I000768

97 S005/S006 right/left brake switch

NOTE: *The **S005** - Switch, right brake is only installed on 1-circuit brake systems (2 brake pedals)*

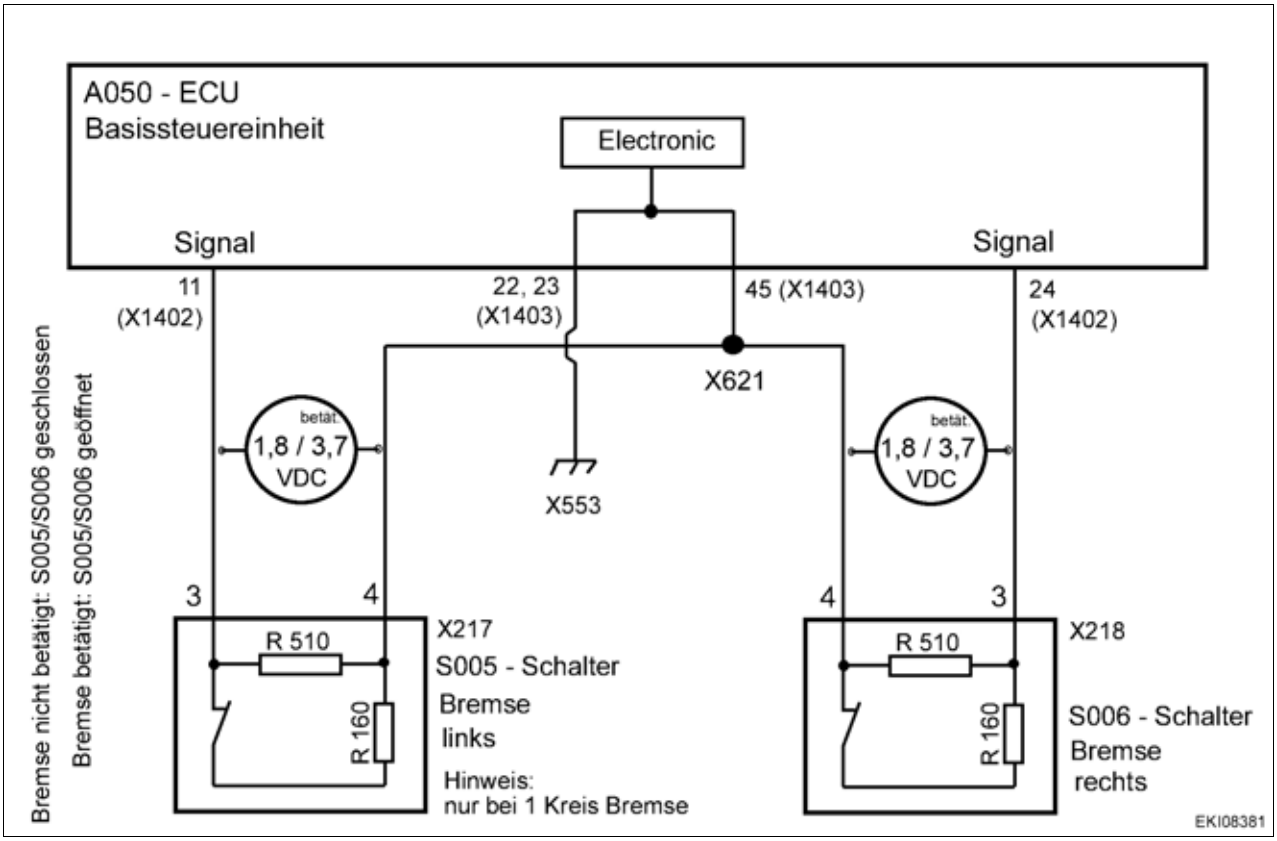


Fig. 383. I001966

Item	Designation	Note
A050 - ECU, basic control unit		
X1402	Separation point on **A050** - ECU, basic control unit	
X1403	Separation point on **A050** - ECU, basic control unit	
11 (on X1402)	Signal from **S005** - Switch, right brake	S005 switch only installed on 1-circuit brake system
24 (on X1402)	Signal from **S006** - Switch, left brake	
45 (on X1403)	Sensor system earth	
22, 23 (on X1403)	Electronics earth	
S005 - Switch, right brake		
X217	Separation point on S005 switch	
Pin 1	Not assigned	
Pin 2	Not assigned	
Pin 3	Signal	
Pin 4	Earth	
S006 - Switch, left brake		
X218	Separation point on S006 switch	
Pin 1	Not assigned	

Item	Designation	Note
Pin 2	Not assigned	
Pin 3	Signal	
Pin 4	Earth	
X553 earth pin		
X621 sensor system earth connector		

Measuring points and signal values

Measuring points on the S005/S006 switch	
Pin	**Function**
1	Not assigned
2	Not assigned
3	Signal
4	Earth

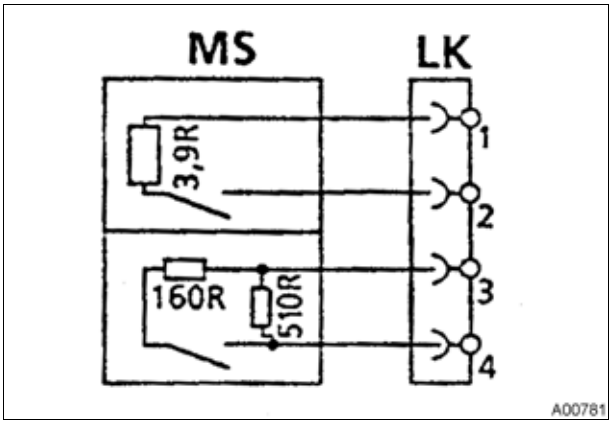


Fig. 384. I001648

NOTE: *Connect the X899.980.246.206 adapter cable directly to the S005/S006 switch.*
Switch on ignition.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Signal	3			
		1.8 VDC	Foot brake not applied (switch closed: 120 ohms)	
		3.7 VDC	Foot brake applied (switch open: 510 ohms)	
Earth	4			

Measuring point on A050 - ECU, basic control unit (X1402 + X1403 separation points)	
Function	**Pin**
Signal (S005 switch)	11 (X1402)
Signal (S006 switch)	24 (X1402)
Sensor system earth	45 (X1403)
Electronics earth	22, 23 (X1403)

NOTE: *see §32*
see §34
see §2

Possible cause of fault

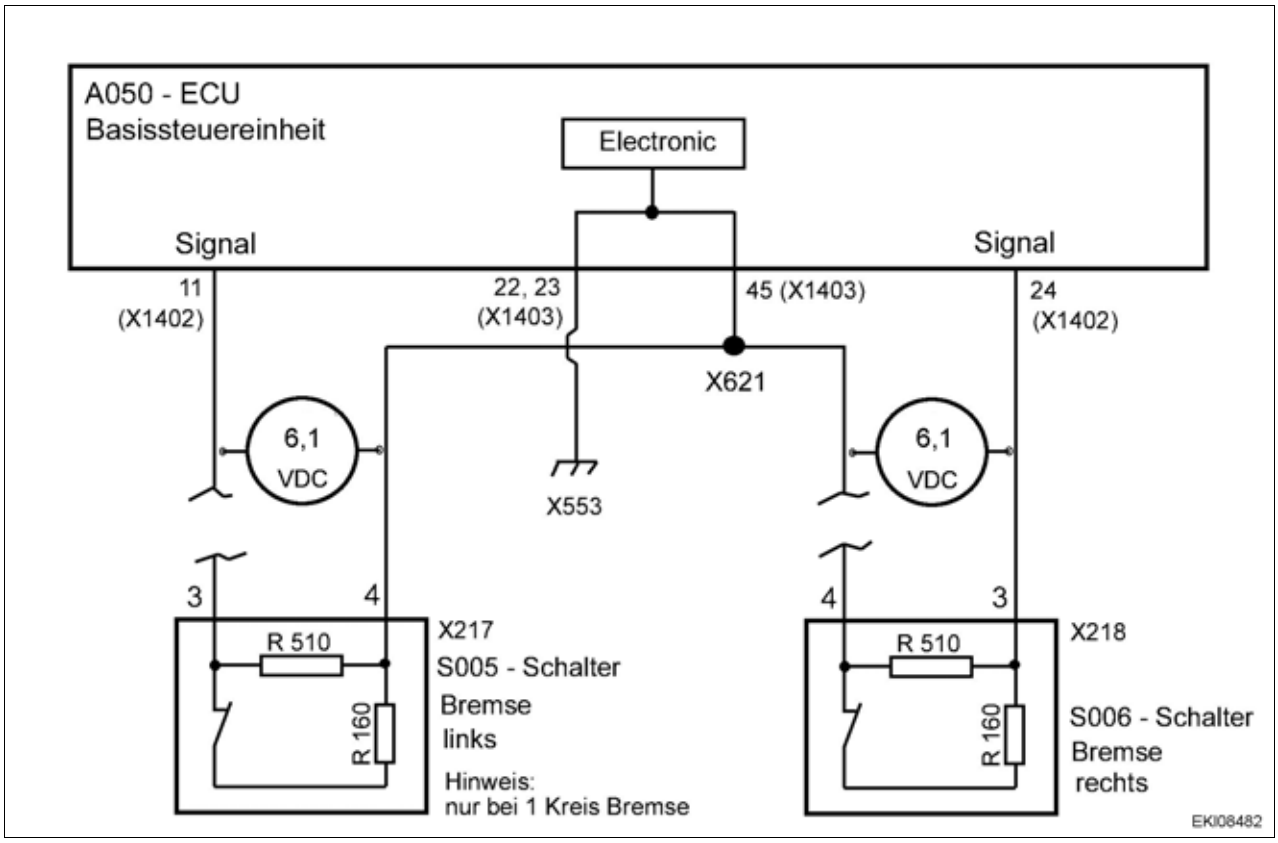


Fig. 385. I001985

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98 S017 filter contamination switch

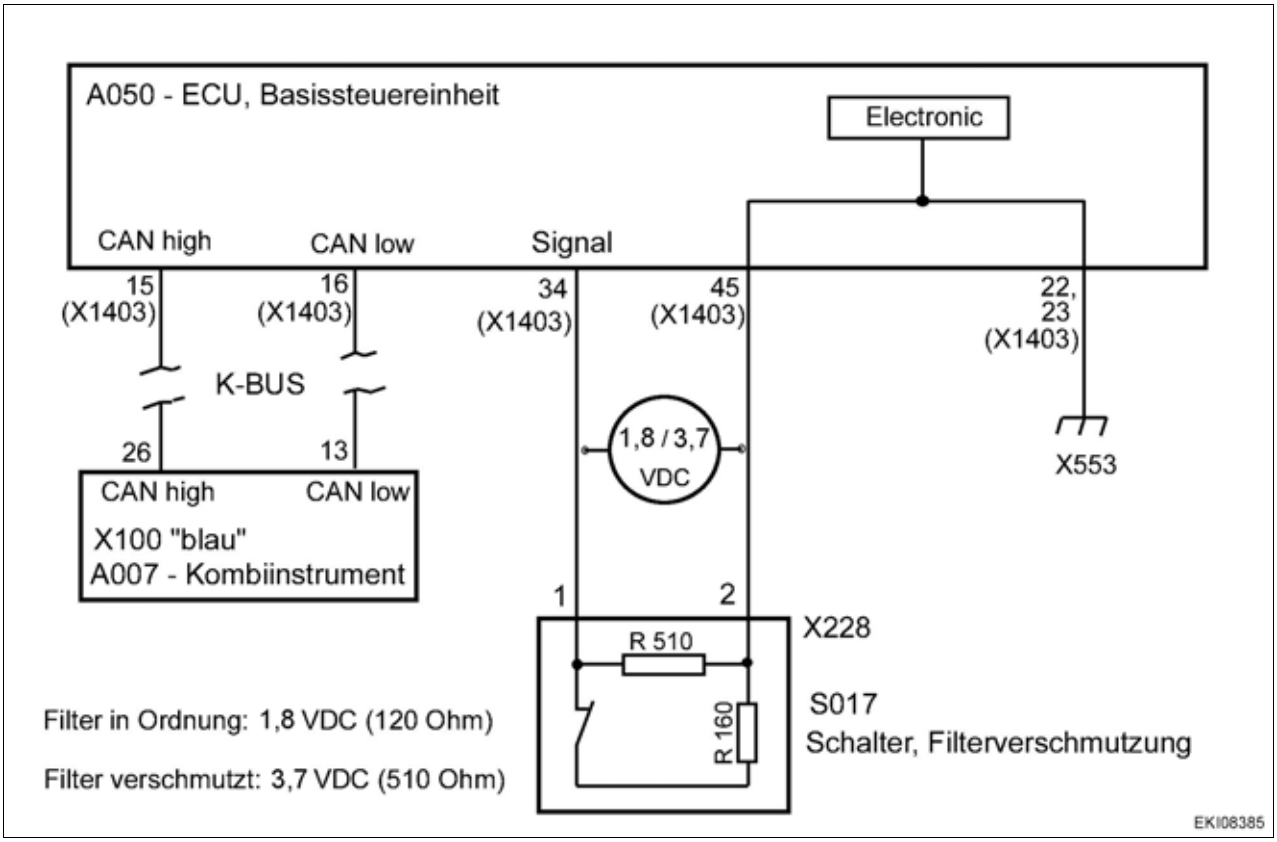


Fig. 386. I001986

Item	Designation	Note
A007 - Instrument panel		
X100	"Blue" separation point on A007	
Pin 26	Control bus_High	
Pin 13	Control bus_Low	
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 34 (X1402)	Signal	
Pin 45 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
Pin 15 (X1403)	Control bus_High	
Pin 16 (X1403)	Control bus_Low	
S017 - Filter contamination switch		
X228	Separation point on S017	
Pin 1	Signal	Filter OK (switch closed, 121 ohms) Filter clogged (switch open, 510 ohms)
Pin 2	Earth	
X553 earth pin		

Measuring points and signal values

S017 - Filter contamination switch (X228 separation point)	
Pin	**Function**
1	Signal
2	Earth

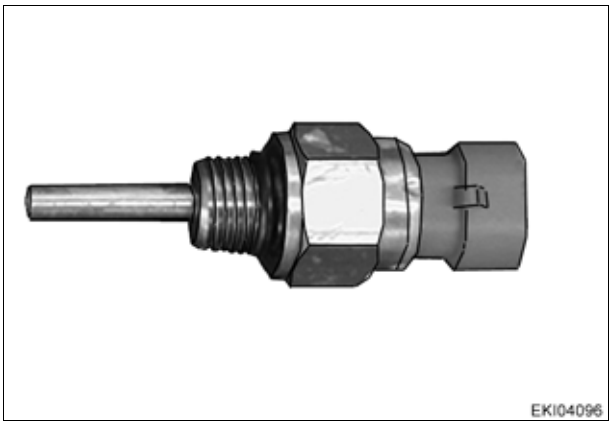


Fig. 387. I000884

NOTE: *Connect the X899.980.246.204 adapter cable directly to the **S017** - Filter contamination switch Switch on ignition.*

Test	Pin	Specified value	condition	Possible cause of fault
Signal	1	1.8 VDC	Transmission high-pressure filter OK (S017 switch closed, 121 ohms)	
		3.7 VDC	Oil temperature below approx. 0°C. Transmission high-pressure filter clogged (S017 switch open, 510 ohms)	
Earth	2			

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Signal	34
Sensor system earth	45
Electronics earth	22, 23

NOTE: *see §31*
see §34

The resistors are (510 ohms and 160 ohms) are switched by means of a Reed element.
The magnet is located in the valve piston of the bypass valve.

NOTE: *Before installing, lubricate the thread on the switch, fit a seal ring and rotate until it lies flush.*

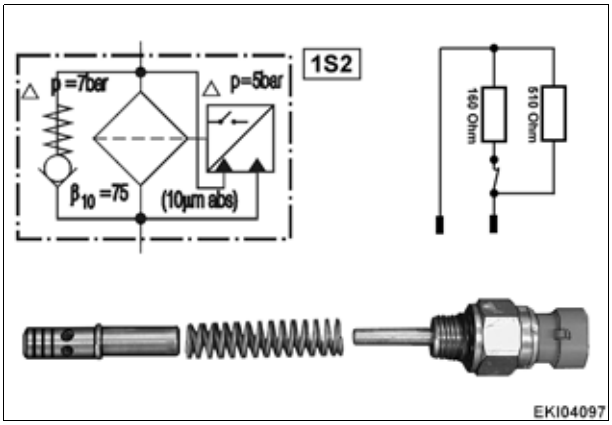


Fig. 388. I000885

When the following conditions are met, a warning message (pressure filter clogged) appears on the instrument panel A007 - Instrument panel:

1. Engine is running
2. Transmission oil temperature above approx. 50 °C ((resistance of **B009** - Discharge temperature sensor below approx. 150 ohms)
3. Pressure difference before and after the pressure filter above 5 bar
4. Items 1 to 3 must apply for min. 2 minutes.

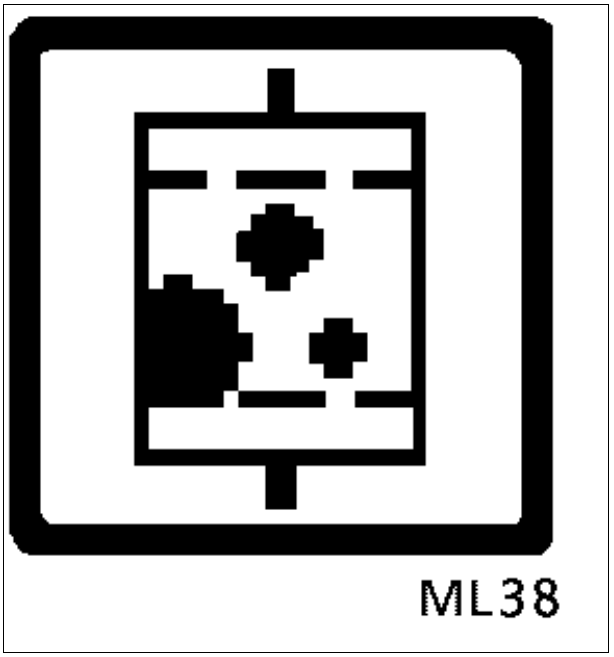


Fig. 389. I000393

Checking the **S017** - Filter contamination switch

– Connect the X899.980.246.204 adapter cable directly to the **S017** - Filter contamination switch
– Connect multimeter (ohmmeter) - Target: **121 ohms**
– Unscrew **S017** - Filter contamination switch by 1 4/6 revolutions
– The value must jump to **510 ohms** on the ohmmeter

Possible cause of fault

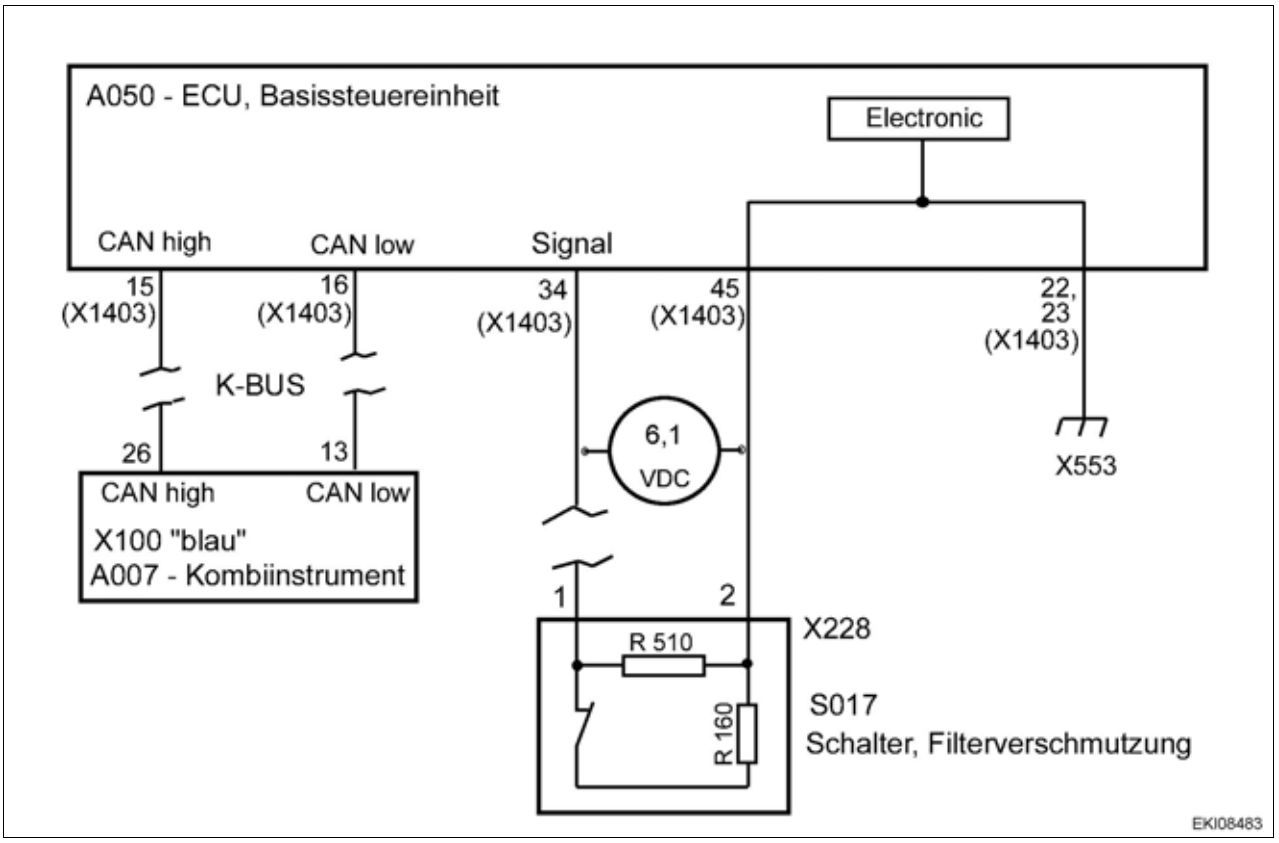


Fig. 390. I001988

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919 .. 0101-1000
919 .. 1001-
922 .. 0101-1000
922 .. 1001-
925 .. 0101-1000
925 .. 1001-
928 .. 0101-1000
928 .. 1001-
931 .. 0101-1000
931 .. 1001-
934 .. 0101-1000
934 .. 1001-

99 S019/S020 left/right rear PTO button (external)

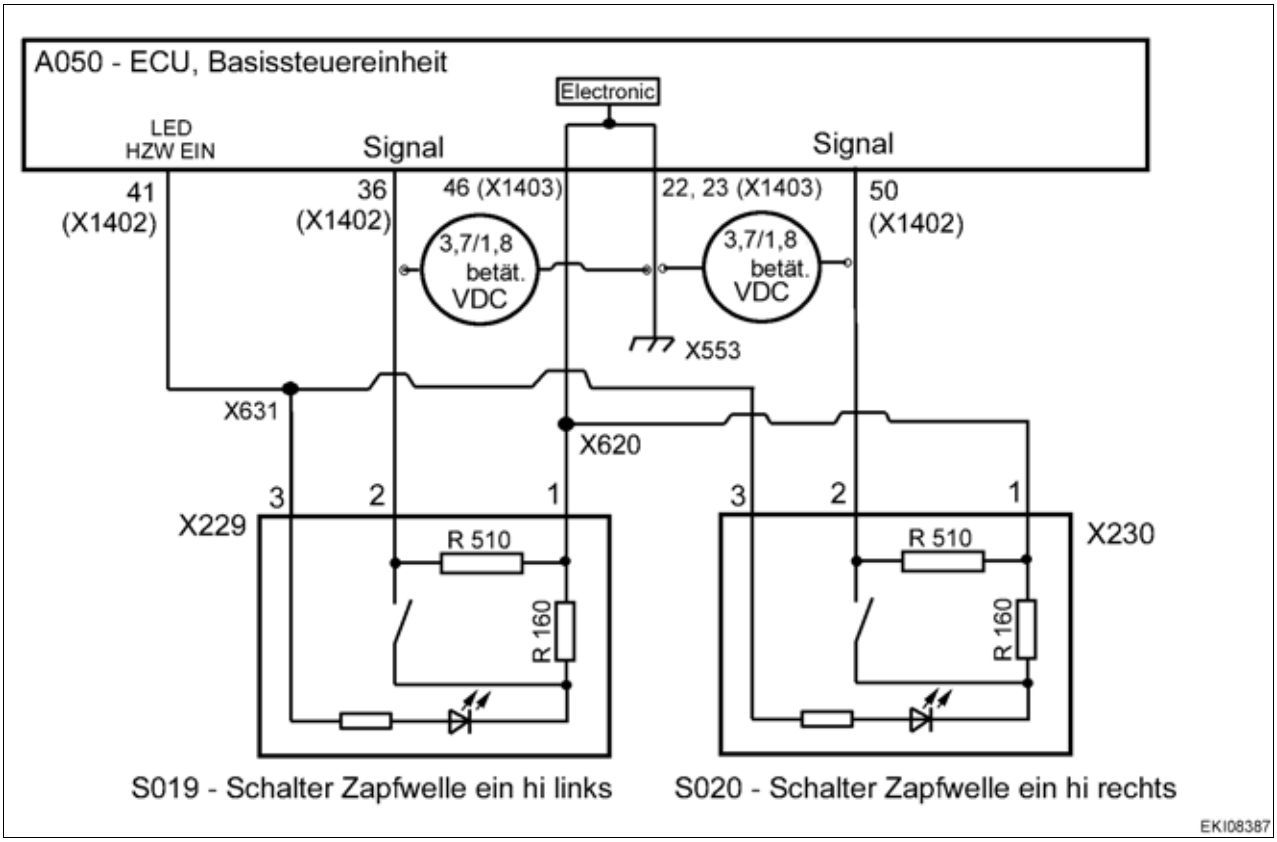


Fig. 391. I001967

Item	Designation	Note
A050 - ECU, basic control unit		
X1402	Separation point on **A050** - ECU, basic control unit	
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 36 (on X1402)	Signal from **S019** - Button, rear PTO, external left	
Pin 41 (on X1402)	Rear PTO LED ON	
Pin 50 (on X1402)	Signal from **S020** - Button, rear PTO, external right	
Pin 46 (at X1403)	Sensor system earth	
Pin 22 and 23	Electronics earth	
S019 - Button, rear PTO, external left		
X229	Separation point on S019	
Pin 1	Earth	
Pin 2	Signal	
Pin 3	Rear PTO LED	
S020 - Button, rear PTO, external right		
X230	Separation point on S020	
Pin 1	Earth	
Pin 2	Signal	
Pin 3	Rear PTO LED	

Item	Designation	Note
X553	Earth pin	
X631	Connector	
X620	Connector, earth	

Measuring points and signal values

S019/S020 button	
Pin	**Function**
1	Earth
2	Signal
3	LED

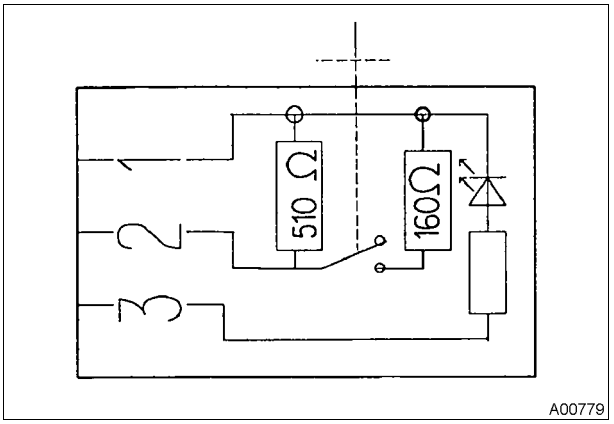


Fig. 392. I001669

NOTE: *Connect the X899.980.246.205 adapter cable directly to the S019/S020 button*
All readings +/- 10%.

Pin assignment and test values on S019 - Button, rear PTO, external left					
Pin on	**Pin on A050**	**S019 button not pressed**	**S019 button pressed**	**Rear PTO engaged LED ON**	**Rear PTO disengaged LED OFF**
1 (earth)	46 (X1403) (earth)	510 ohms 3.7 VDC	121 ohms 1.8 VDC	14 VDC	0 VDC
2 (signal)	36 (X1402) (signal)				
3 LED	41 (X1402) (LED)				

Pin assignment and test values on S020 - Button, rear PTO, external right					
Pin on S020	**Pin on A050**	**S020 button not pressed**	**S020 button pressed**	**Rear PTO engaged LED ON**	**Rear PTO disengaged LED OFF**
1 (earth)	46 (X1403) (earth)	510 ohms 3.7 VDC	121 ohms 1.8 VDC	14 VDC	0 VDC
2 (signal)	50 (X1402) (signal)				
3 LED	41 (X1402) (LED)				

Measuring point on A050 - ECU, basic control unit (X1402 + X1403 separation points)	
Function	**Pin**
Signal from S019	36 (X1402)
Rear PTO LED	41 (X1402)
Signal from S020	50 (X1402)
Sensor system earth	46 (X1403)
Electronics earth	22, 23 (X1403)

NOTE: *see §28*
see §34

Possible cause of fault



Fig. 393. I001969

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100 S021/S022 front power lift raise/lower button (external)

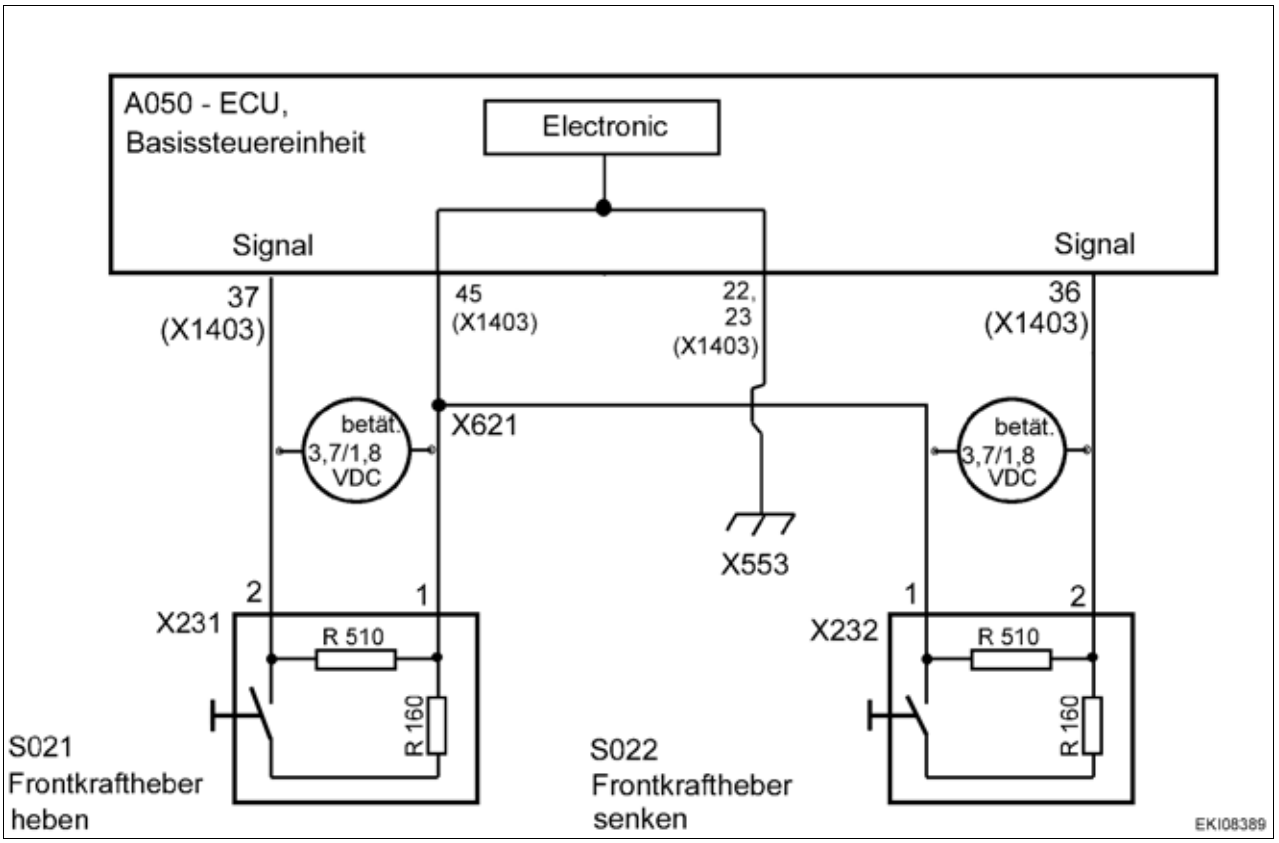


Fig. 394. I001972

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
36 (on X1403)	Signal at **S022** - Button, front power lift, external lower	
37 (on X1403)	Signal at **S021** - Button, front power lift, external raise	
Pin 45 (to X1403)	Sensor system earth	
Pin 22 and 23	Electronics earth	
S021 - Button, front power lift, external raise		
X231	Separation point on S021	
Pin 1	Signal	
Pin 2	Earth	
S022 - Button, front power lift, external lower		
X232	Separation point on S022	
Pin 1	Signal	
Pin 2	Earth	
X553	Earth pin	
X621	Connector, earth	

Measuring point and signal values

S021/S022 button	
Pin	**Function**
1	Earth
2	Signal
3	Not assigned



Fig. 395. I001670

Measuring resistance

NOTE: *Connect the adapter cable X899.980.246.205 directly to the component (plug adapter cable into the component only).*
Switch off ignition.
All readings +/- 10%

S021/S022 button				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
Signal	2	510 ohms	Button not pressed	
		121 ohms	Button pressed	
Earth	1			

Measuring signal voltage

NOTE: *Connect the X899.980.246.205 adapter cable directly to the component.*
Switch on ignition.
All readings +/- 10%

S021/S022 switch				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
Signal	2	3.7 VDC	Button not pressed	
		1.8 VDC	Button pressed	
Earth	1			

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Signal from S022	36
Signal from S022	37
Sensor system earth	46
Electronics earth	22, 23

NOTE: *see §24*
see §25
see §34

Possible cause of fault

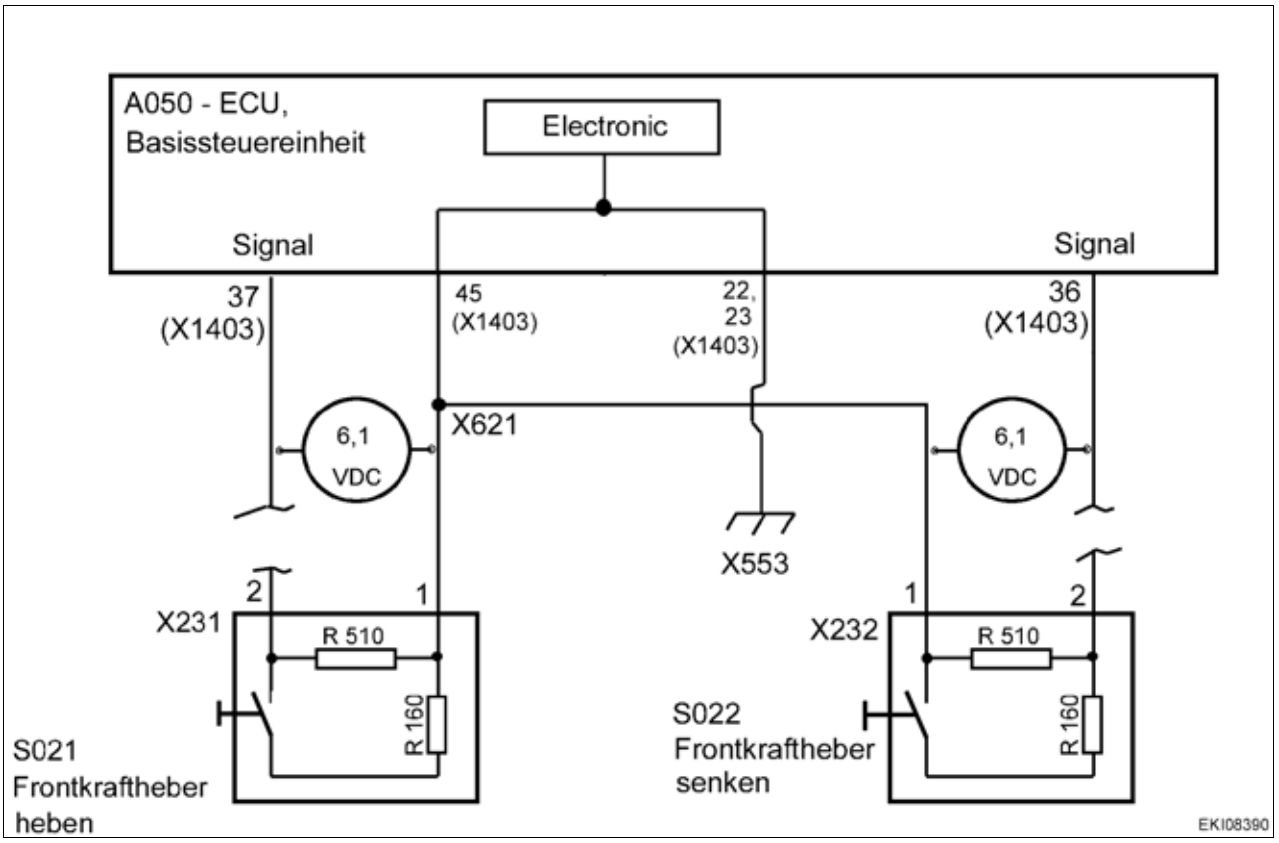


Fig. 396. I001973

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101 S025 pressure monitor control pump switch

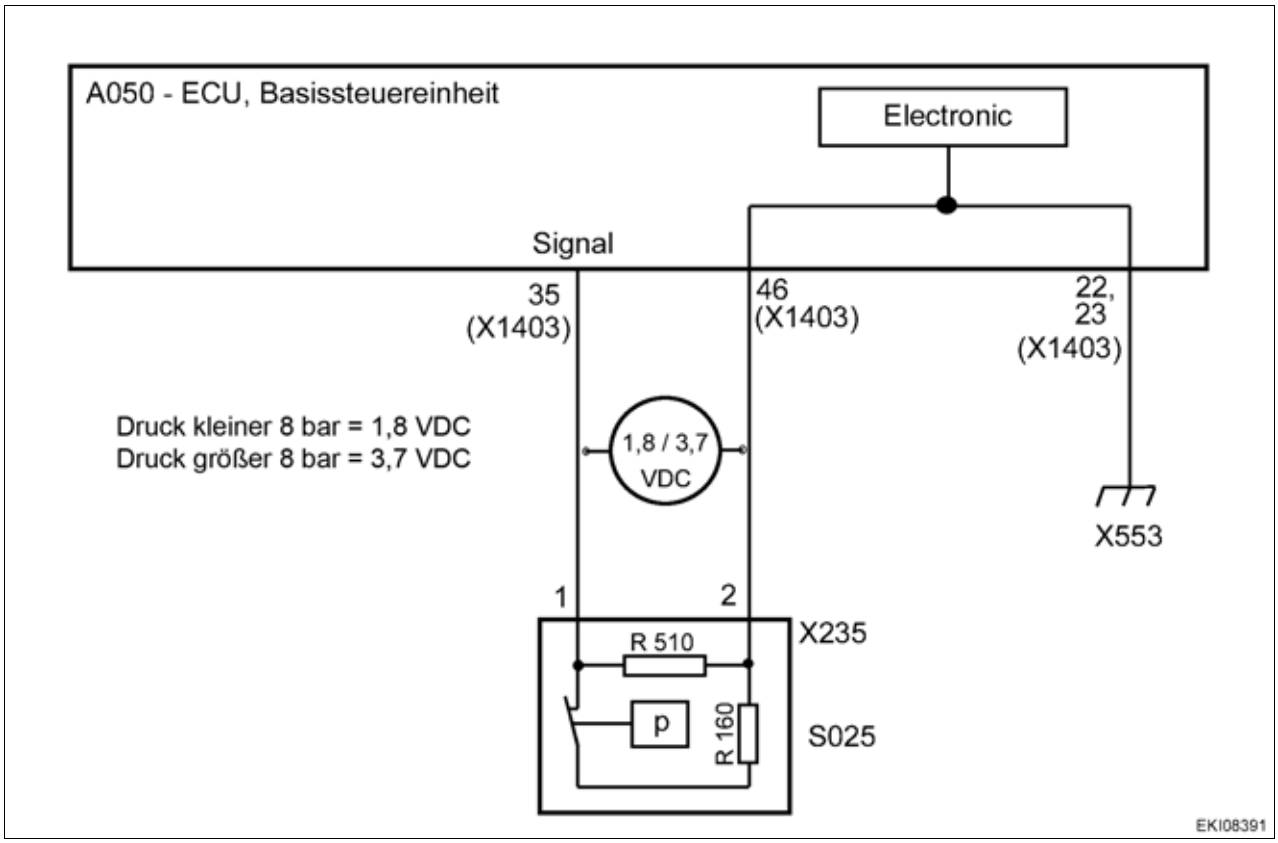


Fig. 397. I001970

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 35 (X1403)	Signal	
Pin 46 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
S025 - Switch, LS pump pressure monitor		
X235	Separation point on S025	
Pin 1	Signal	
Pin 2	Earth	
X553 earth pin		

Measuring points and signal values

S025 switch	
Pin	**Function**
1	Signal
2	Earth



Fig. 398. I001124

Measuring resistance

NOTE: *Connect the X899.980.246.204 adapter cable directly to the component*
All readings +/- 10%

Test	Pin	Specified value	condition	Possible cause of fault
Signal	1	121 ohms	Pressure below 8 bar (switch closed)	
		510 ohms	Pressure above 8 bar (switch open)	
Earth	2			

Measuring signal voltage

NOTE: *Connect the X899.980.246.204 adapter cable directly to the component*
Switch on ignition.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Signal	1	1.8 VDC	Pressure below 8 bar (switch closed)	
		3.7 VDC	**– Engine running (above 1000 rpm)** **- Pressure greater than 8 bar (switch opened)**	
Earth	2			

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Signal	35
Sensor system earth	46
Electronics earth	22, 23

NOTE: *see §21*
see §34

Display accompanied by a continuous beep and warning light
Steering pump or control pump has failed.

Result:
All valves are locked from 1000 rpm

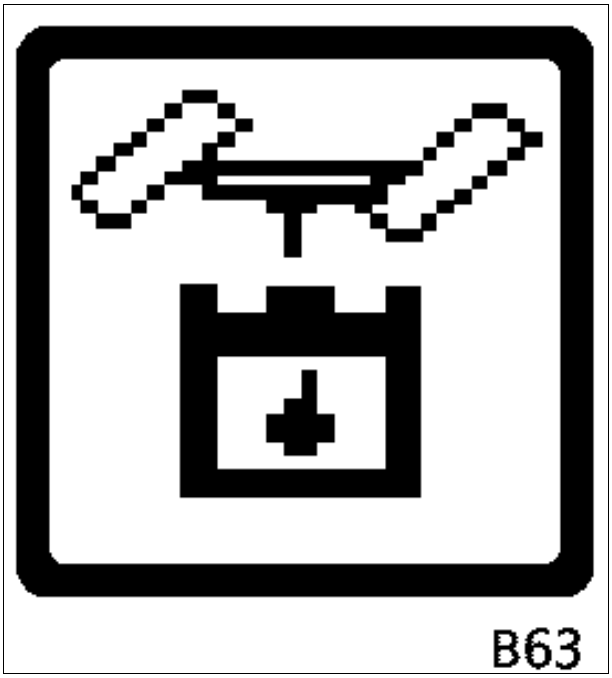


Fig. 399. I001678

Possible cause of fault

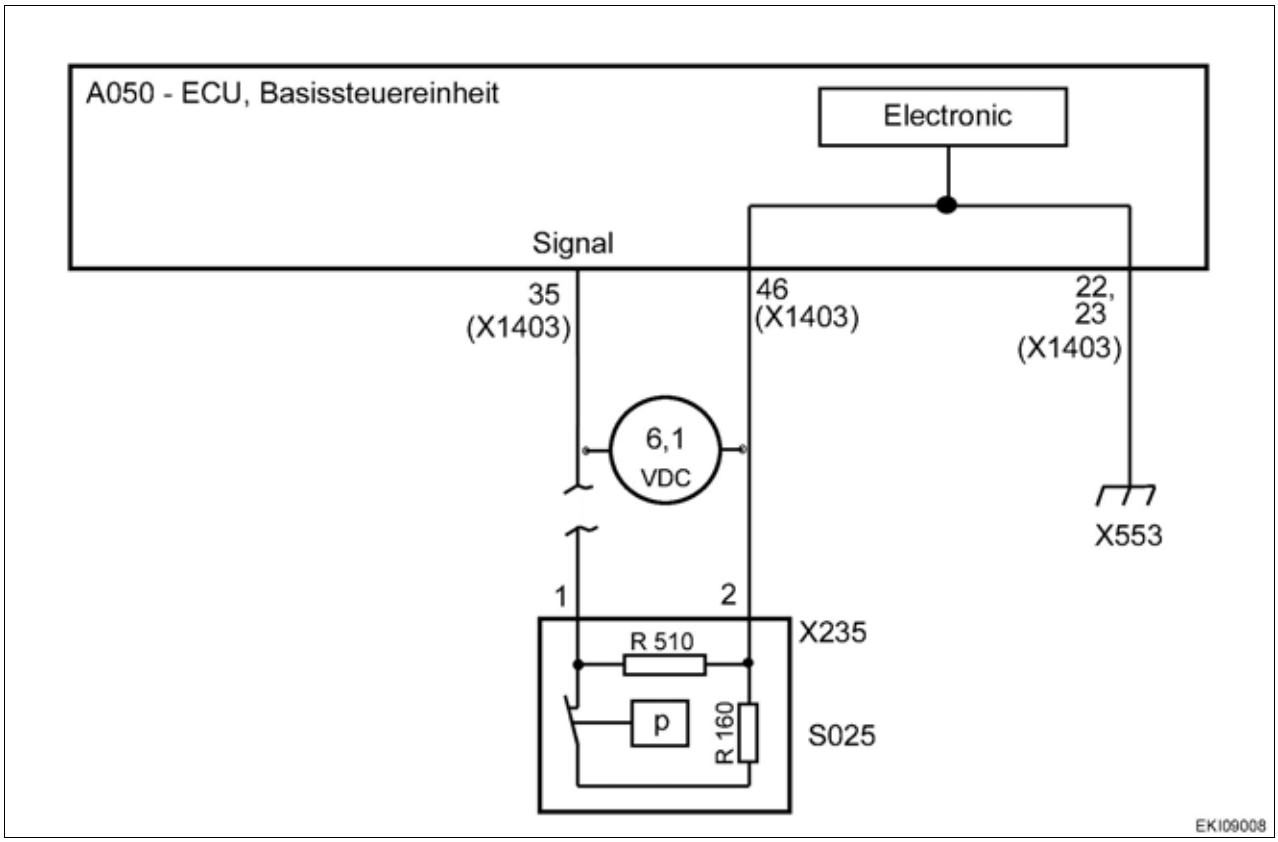


Fig. 400. I003568

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102 S026 steering pump flow monitor switch

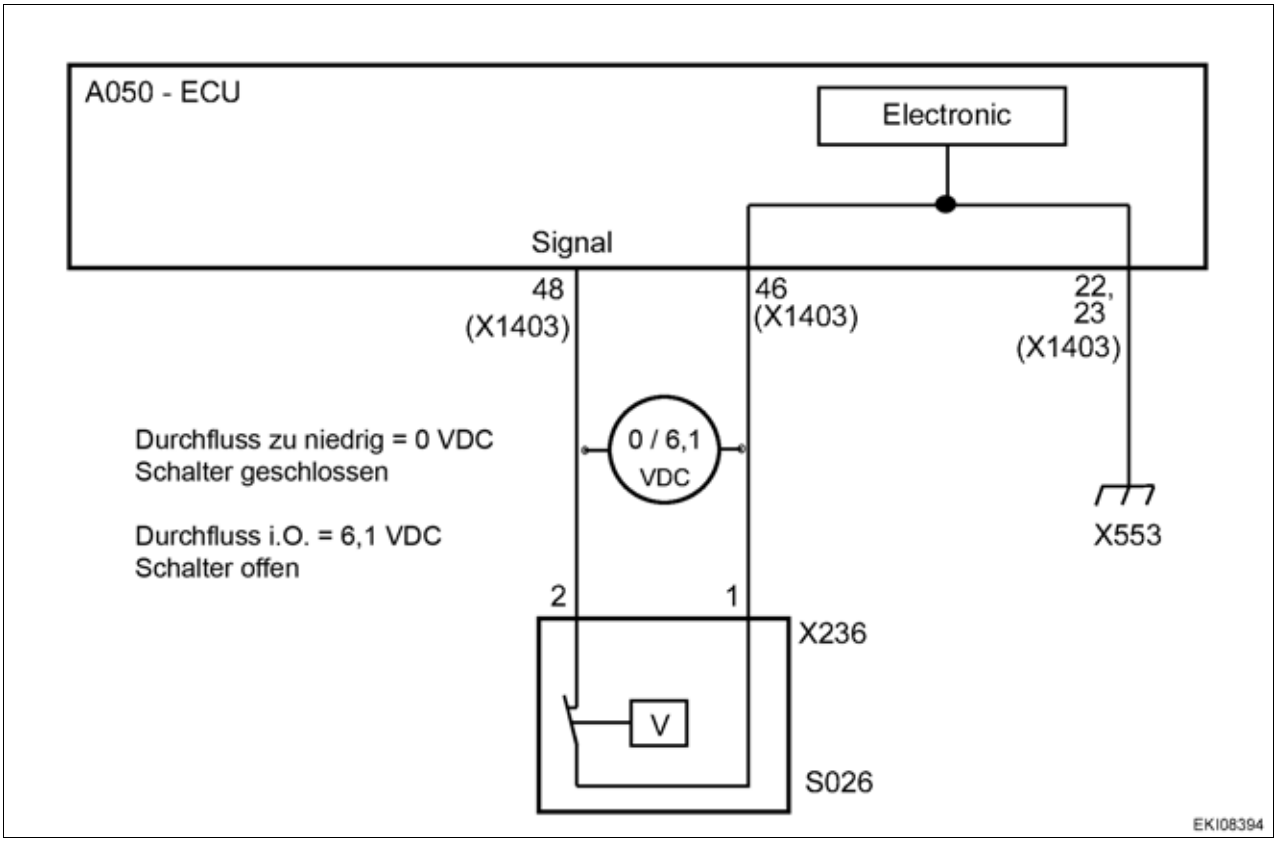


Fig. 401. I001974

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 48 (X1403)	Signal	
Pin 46 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
S026 - Switch, steering pump flow controller		
X236	Separation point on S026	
Pin 1	Earth	
Pin 2	Signal	– No oil flow present (switch closed) – Oil flow present (switch open)
X553 earth pin		

Measuring points and signal values

S026 - Switch, steering pump flow controller	
Pin	**Function**
1	Earth
2	Signal



Fig. 402. I001125

Measuring signal voltage

NOTE: *Connect the X899.980.246.204 adapter cable directly to the component*
Switch on ignition.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Signal	2	approx. 0 VDC	– Ignition ON – No oil flow present (switch closed)	
		6.1 VDC	**– Engine running (above 1000 rpm)** **– Oil flow present** (switch open)	
Earth	1			

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Signal	48
Sensor system earth	46
Electronics earth	22, 23

NOTE: *see §21*
see §34

Display accompanied by a continuous beep and warning light
Steering pump or control pump has failed.

Result:
All valves are locked from 1000 rpm

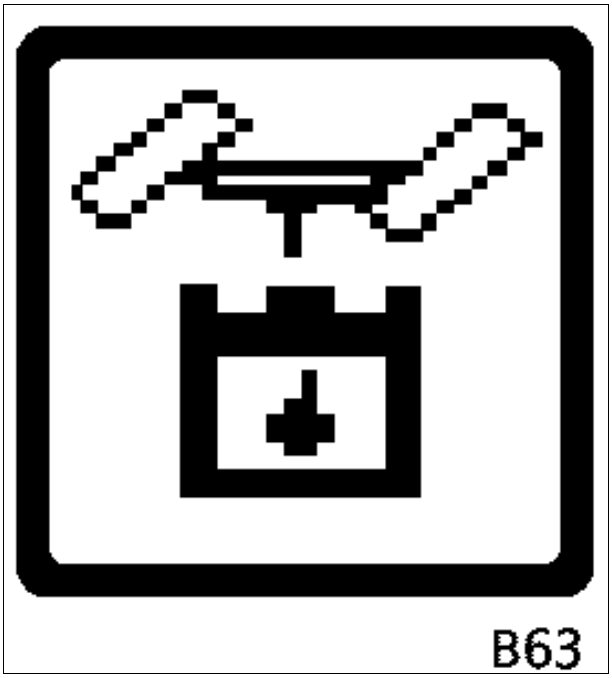


Fig. 403. I001678

Possible cause of fault

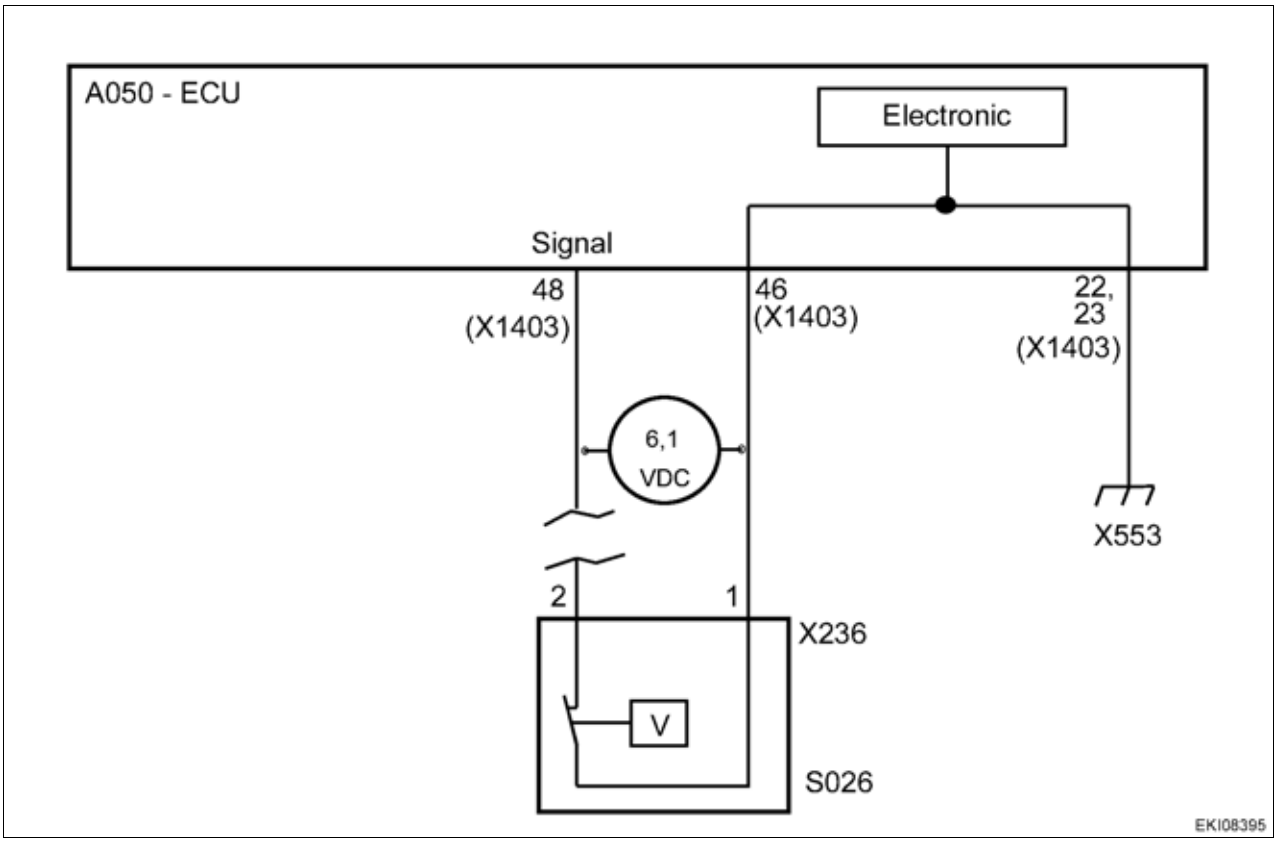


Fig. 404. I001975

Flow direction and torque values at S026 flow monitor
NOTE: *The S026 flow monitor can only be supplied as a complete unit.*

919 .. 0101-1000
919 .. 1001-
922 .. 0101-1000
922 .. 1001-
925 .. 0101-1000
925 .. 1001-
928 .. 0101-1000
928 .. 1001-
931 .. 0101-1000
931 .. 1001-
934 .. 0101-1000
934 .. 1001-

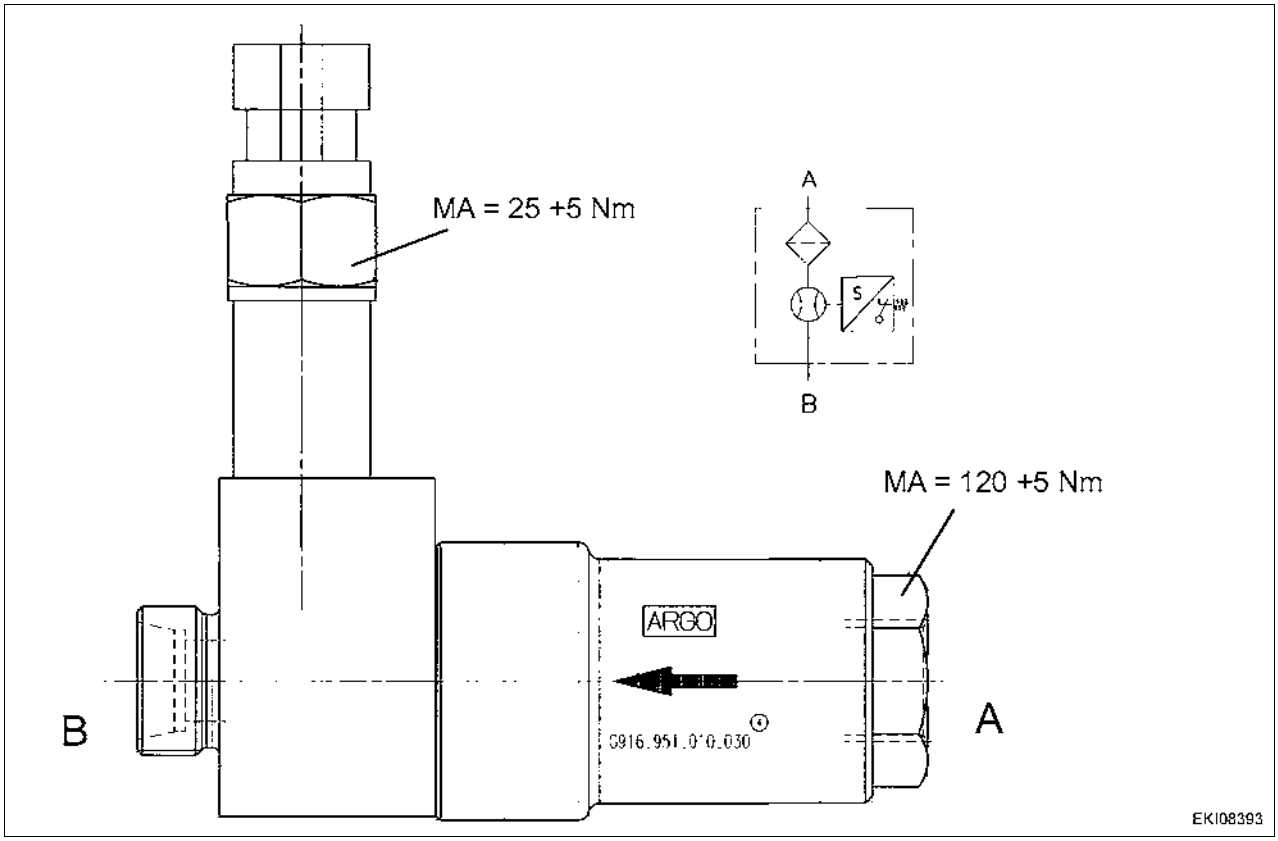


Fig. 405.

I001677

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103 S027/S028/S029/S030 rear power lift button (external)

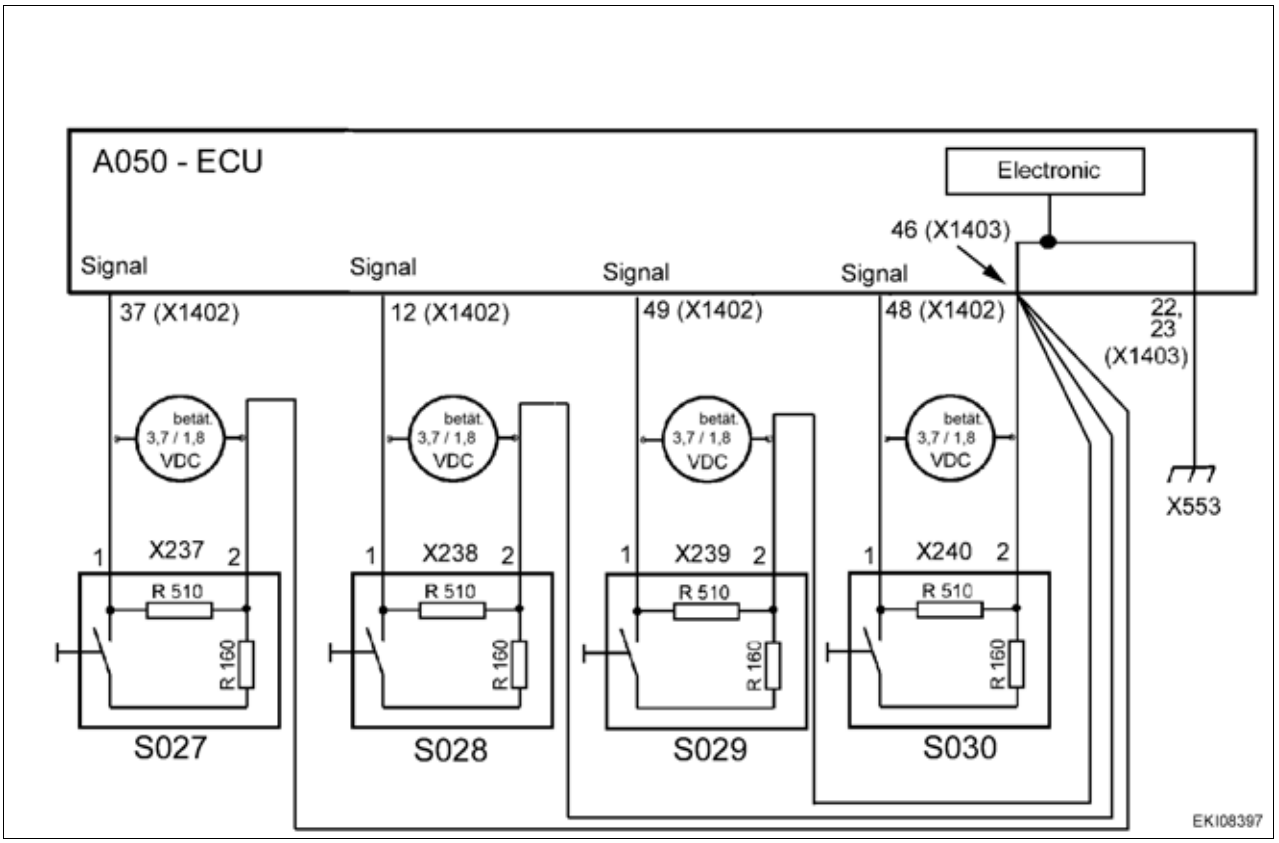


Fig. 406. I001976

Item	Designation	Note
A050 - ECU, basic control unit		
X1402	Separation point on **A050** - ECU, basic control unit	
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 12 (X1402)	External signal, lower rear power lift (right)	
Pin 37 (X1402)	External signal, raise rear power lift (right)	
Pin 48 (X1402)	External signal, lower rear power lift (left)	
Pin 49 (X1402)	External signal, raise rear power lift (left)	
Pin 46 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
S027 - Button, rear power lift, right-hand external raise		
S028 - Button, rear power lift, right-hand external lower		
S029 - Button, rear power lift, left-hand external raise		
S030 - Button, rear power lift, left-hand external lower		
X237	Separation point on S027	
X238	Separation point on S028	
X239	Separation point on S029	
X240	Separation point on S030	
Pin 1	Signal	

Item	Designation	Note
Pin 2	Earth	
X553 earth pin		

Measuring points and signal values

S027/S028/S029/S030 button	
Pin	**Function**
1	Signal
2	Earth
3	Not assigned



Fig. 407. I001670

Measuring resistance

NOTE: *Connect the adapter cable X899.980.246.205 directly to the component (plug adapter cable into the component only).*
Switch off ignition.
All readings +/- 10%.

S027/S028/S029/S030 button				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
Signal	1	510 ohms	Switch not pressed	
		121 ohms	Switch pressed	
Earth	2			

Measuring signal voltage

NOTE: *Connect the X899.980.246.205 adapter cable directly to the component.*
Switch on ignition.
All readings +/- 10%.

S027/S028/S029/S030 button				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
Signal	1	3.7 VDC	Switch not pressed	
		1.8 VDC	Switch pressed	
Earth	2			

Measuring point on A050 - ECU, basic control unit (X1402 + X1403 separation points)	
Function	**Pin**
Signal, lower (right)	12 (X1402)
Signal, raise (right)	37 (X1402)
Signal, lower (left)	48 (X1402)

Measuring point on A050 - ECU, basic control unit (X1402 + X1403 separation points)	
Function	**Pin**
Signal, raise (left)	49 (X1402)
Sensor system earth	46 (X1403)
Electronics earth	22 and 23 (on X1403)

NOTE: *see §22*
see §34

Possible cause of fault

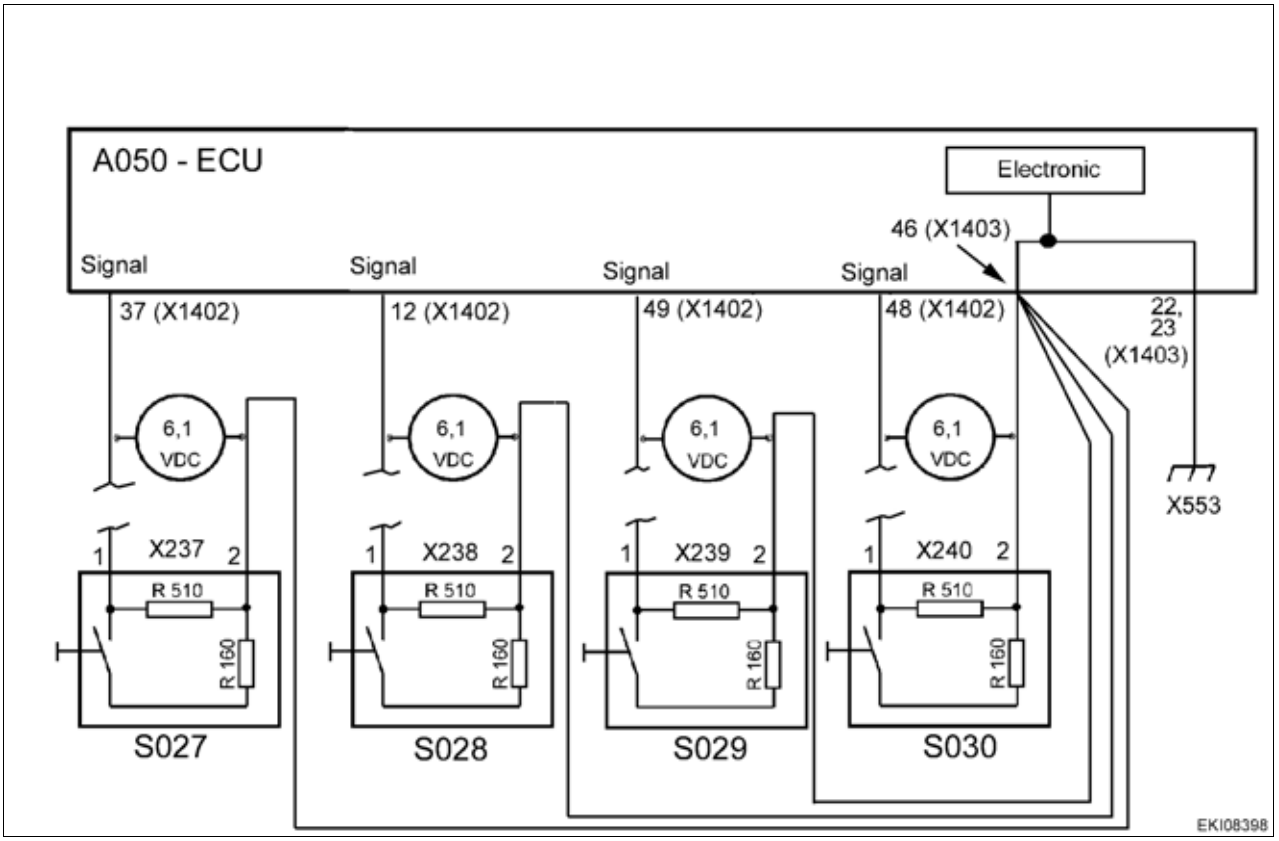


Fig. 408. I001977

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104 S034 coolant level switch

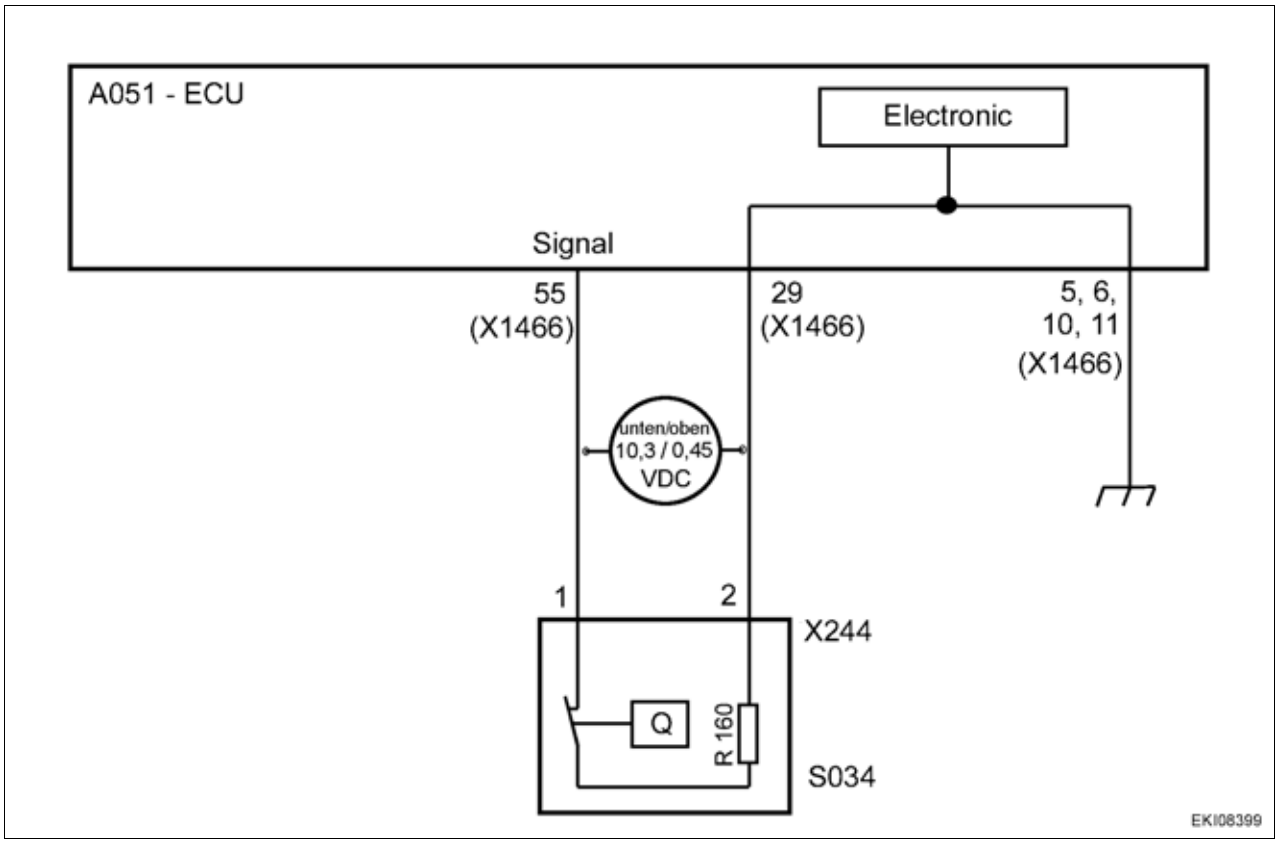


Fig. 409. I002041

Item	Designation	Note
A051 - ECU, engine control unit (EDC 7).		
X1466	Separation point on **A051** - ECU, engine control unit (EDC 7).	
Pin 55 (X1466)	Signal	
Pin 29 (X1466)	Sensor system earth	
Pin 5, 6, 10, 11 (X1403)	Electronics earth	
S034 - Switch, coolant level		
X244	Separation point on S034	
Pin 1	Signal	
Pin 2	Earth	– Float at bottom (switch open) – Float at top (switch closed, approx. 160 ohms)

Measuring points and signal values

S034 switch	
Pin	**Function**
1	Signal
2	Earth



Fig. 410. I001131

NOTE: *Connect the X899.980.246.204 adapter cable directly to the component Switch on ignition.*

Test	Pin	Specified value	condition	Possible cause of fault
Signal	1	Approx. 10.3 VDC	Float at bottom (switch open)	
		Approx. 0.45 VDC	Float at top (switch closed, 160 ohms)	
Earth	2			

Measuring point on the A051 - ECU, engine control unit (EDC 7). (X1466 separation point)	
Function	**Pin**
Signal	55
Sensor system earth	29

NOTE: *see §36*
see §37

Further testing options

Test S034 switch when it is removed
Connect multimeter (ohmmeter) to the electrical connections.
Target values:
Float at bottom = switch open (infinite resistance).
Float at top = switch closed (approx. 160 ohms).

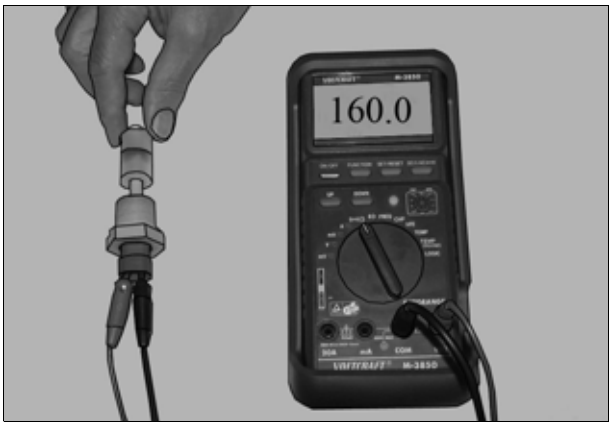


Fig. 411. I007628

Check error message with resistance decade
Component S034 disconnected.
Plug X899.980.246.204 adapter cable into separation point.
Connect X899.980.224 resistance decade and select corresponding resistance.

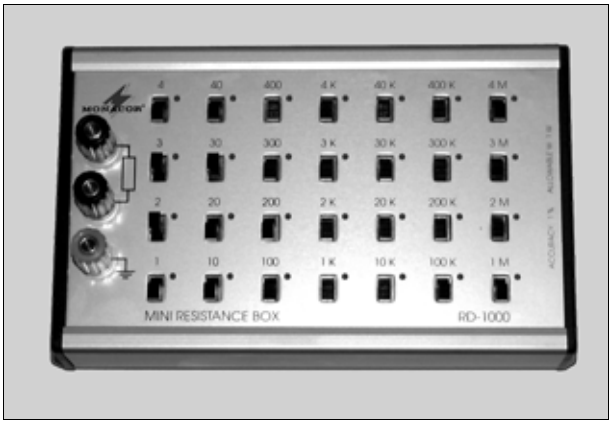


Fig. 412. I000639

Warning message: coolant below required level

NOTE: *Allow preconditioning time.*

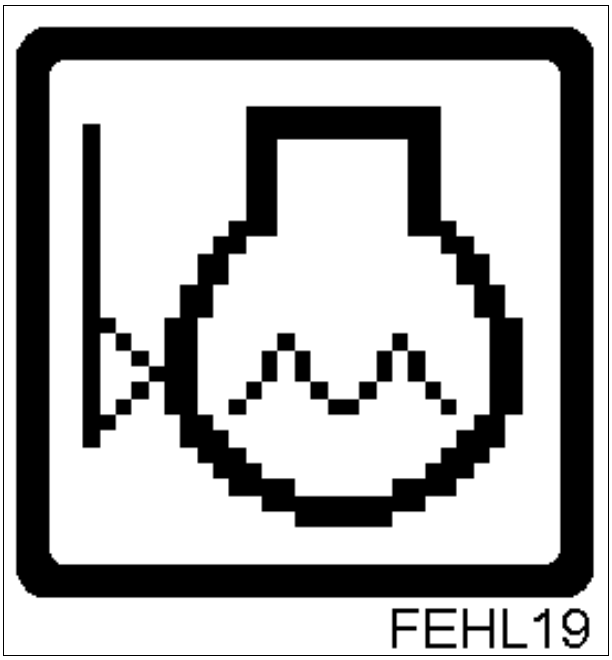


Fig. 413. I000413

105 S045 switch, reverse operation positioning

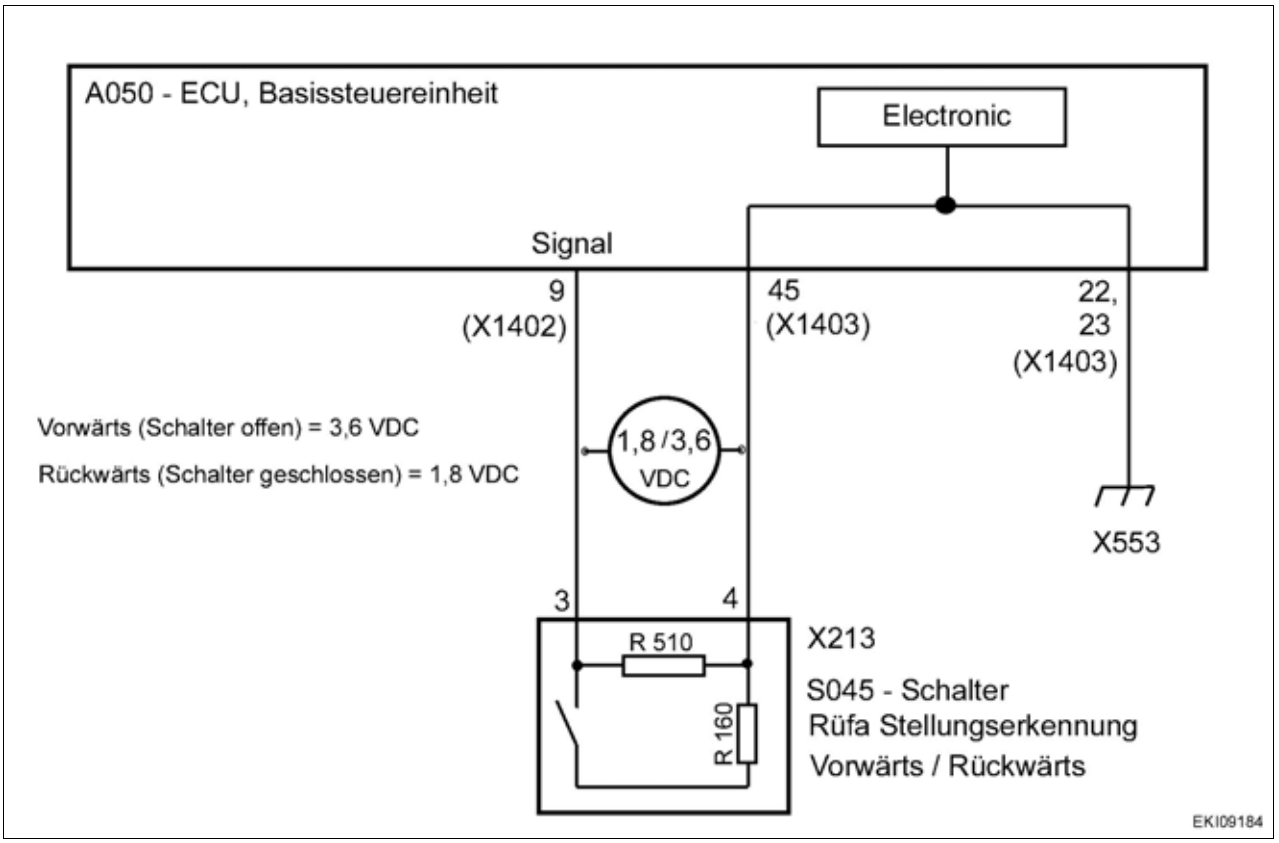


Fig. 414. I004831

Measuring points and signal values

Solenoid switch (contact)
(H 312.100.070.500)

Solenoid is upstream of the solenoid switch:
Switch closed

Solenoid removed from the solenoid switch:
Switch open

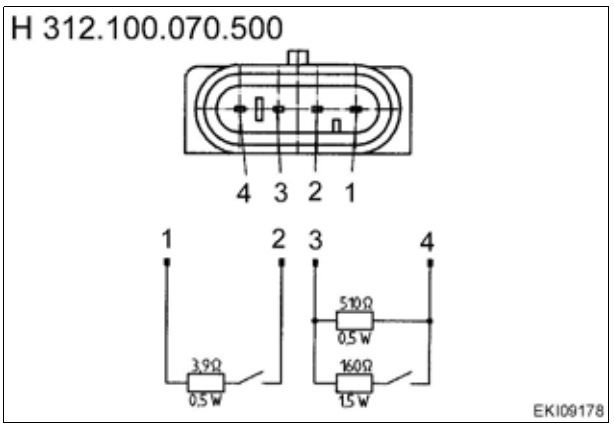


Fig. 415. I004821

Measuring resistance (ohms)

NOTE: *Measure pins directly on the component*
Switch off ignition.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Signal	3	510 ohms	"Rüfa" reverse drive control is facing **forwards** (solenoid removed from switch) (switch open)	
		121 ohms	"Rüfa" reverse drive control is facing **backwards** (solenoid is upstream of switch) (switch closed)	
Earth	4			

Measuring signal voltage

NOTE: *Connect the X899.980.304.000 adapter box to the A050 ECU, basic control unit.*
Measure pins 9 (X1402) and 45 (X1403)
Ignition on
Hand brake applied
Compressed air supply available
All readings +/- 10%.

				Break in wiring	
Pin	description	Signal type/condition	Signal	Signal from ECU	Signal from compo-nent
9 (X1402)	**Signal**	"Rüfa" reverse drive control is facing **forwards** (solenoid removed from switch) (switch open)	3.7 VDC	6.1 VDC	0 VDC
		"Rüfa" reverse drive control is facing **backwards** (solenoid is upstream of switch) (switch closed)	1.8 VDC		
45 (X1403)	**Earth**				

Measuring point on A050 - ECU, basic control unit (X1402 + X1403 separation points)	
Function	**Pin**
Activation of **S045** - Switch, reversing driver stand	9 (X1402)
Earth	45 (X1403)

NOTE: *see §31*
see §34
see §1

Possible cause of fault

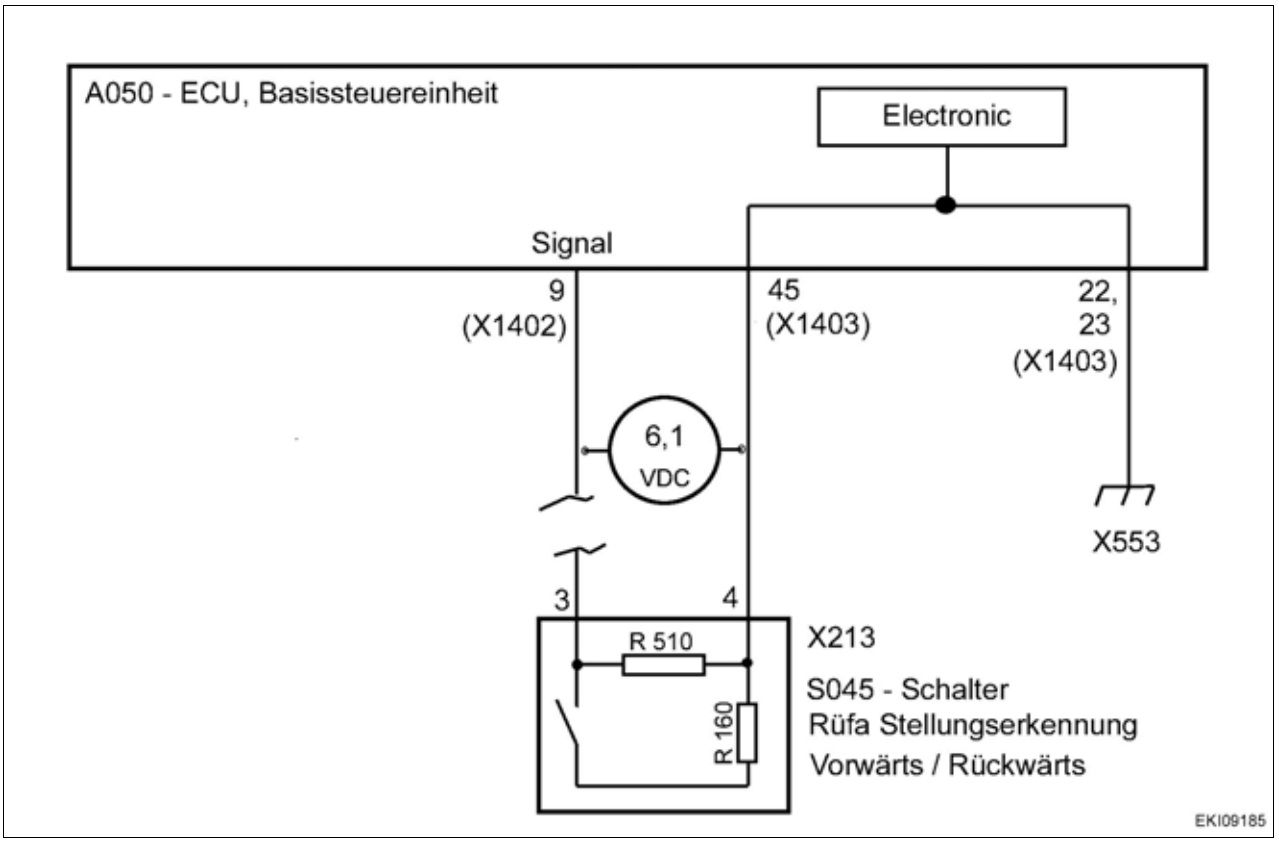


Fig. 416. I004832

106 S047 switch, engine brake

NOTE: *The engine brake only becomes effective at engine speeds above 900 rpm.*
Full braking effect at high engine speeds only.
Maximum permissible engine speed 2600 rpm.

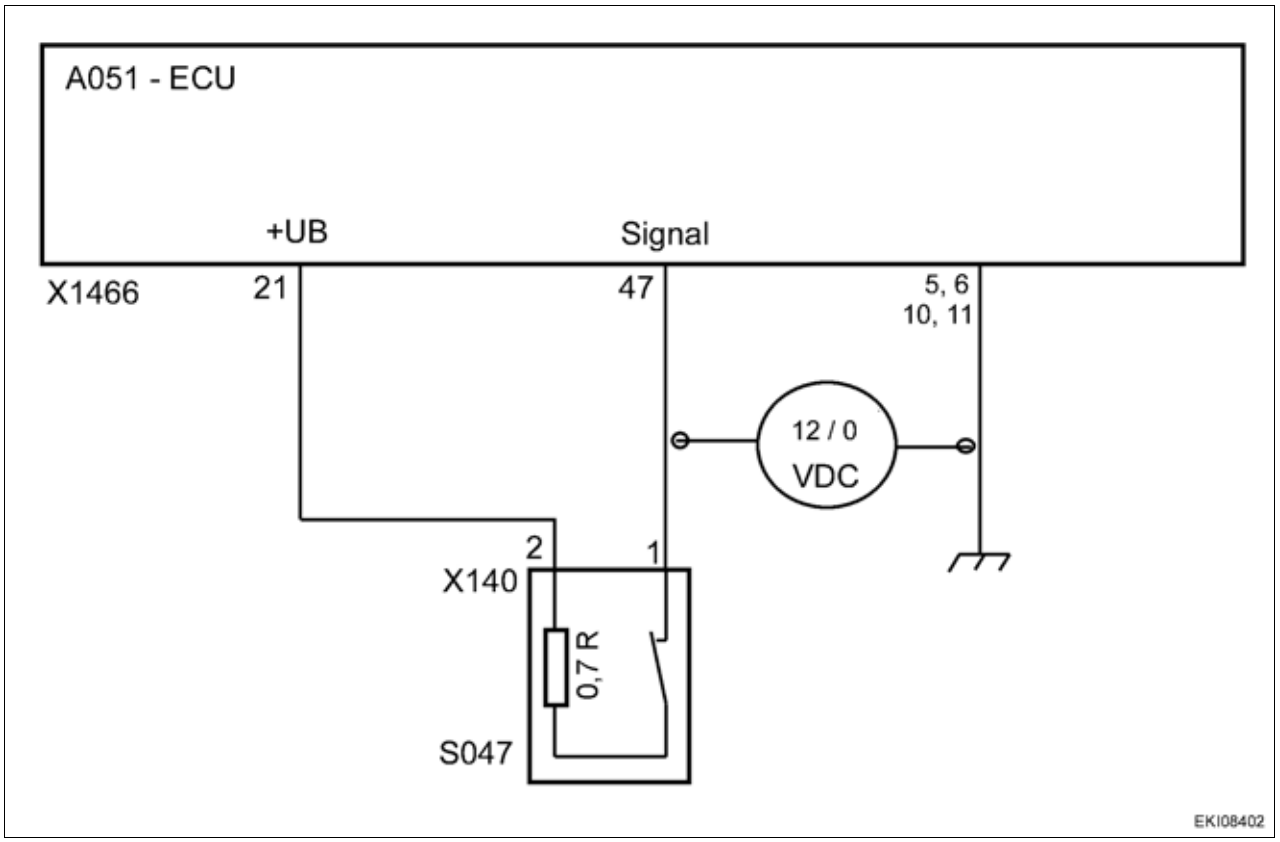


Fig. 417. I002058

Item	Designation	Note
A051 - ECU, engine control unit (EDC 7).		
X1466	Separation point on **A051** - ECU, engine control unit (EDC 7).	
Pin 21	+ UB sensors	
Pin 47	Signal	
Pin 5, 6, 10, 11	Earth	
S047 - Switch, engine brake		
X140	Separation point on S047 switch	
Pin 1	Signal	– Engine brake not actuated (switch closed) – Engine brake actuated (switch open)
Pin 2	+ UB sensors	

Measuring points and signal values

S047 switch	
Pin	**Function**
1	Signal
2	+ UB sensors

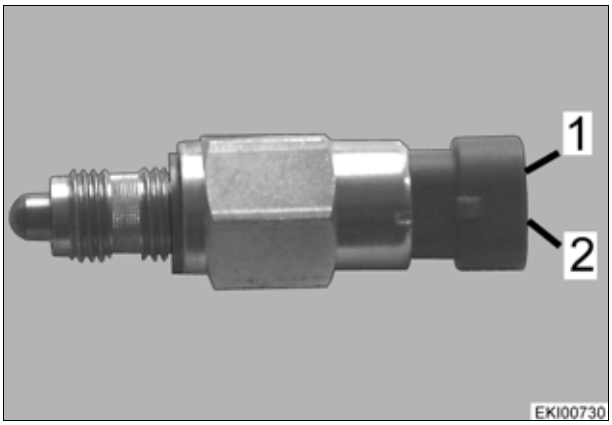


Fig. 418. I001687

Measuring resistance (ohms)

NOTE: *Connect the X899.980.246.204 adapter cable directly to the component*
Switch off ignition.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
+ UB sensors	2	Approx. 0.7 ohms	Engine brake not actuated (switch closed)	
		Infinite resistance	Engine brake actuated (switch open)	
Signal	1			

Measuring signal voltage

NOTE: *Connect the X899.980.246.204 adapter cable directly to the component*
Switch on ignition.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
+ UB sensors	2	12 VDC	Ignition ON.	
Vehicle earth				
Signal	1	12 VDC	Engine brake not actuated (switch closed)	
		0 VDC	Engine brake actuated (switch open)	
Vehicle earth				

Measuring point on the A051 - ECU, engine control unit (EDC 7). (X1466 separation point)	
Function	**Pin**
+ UB sensors	21
Signal	47
Earth	5, 6, 10, 11

NOTE: *see §36*
see §37

107 S067/S068 button, valve actuation raise/lower (external)

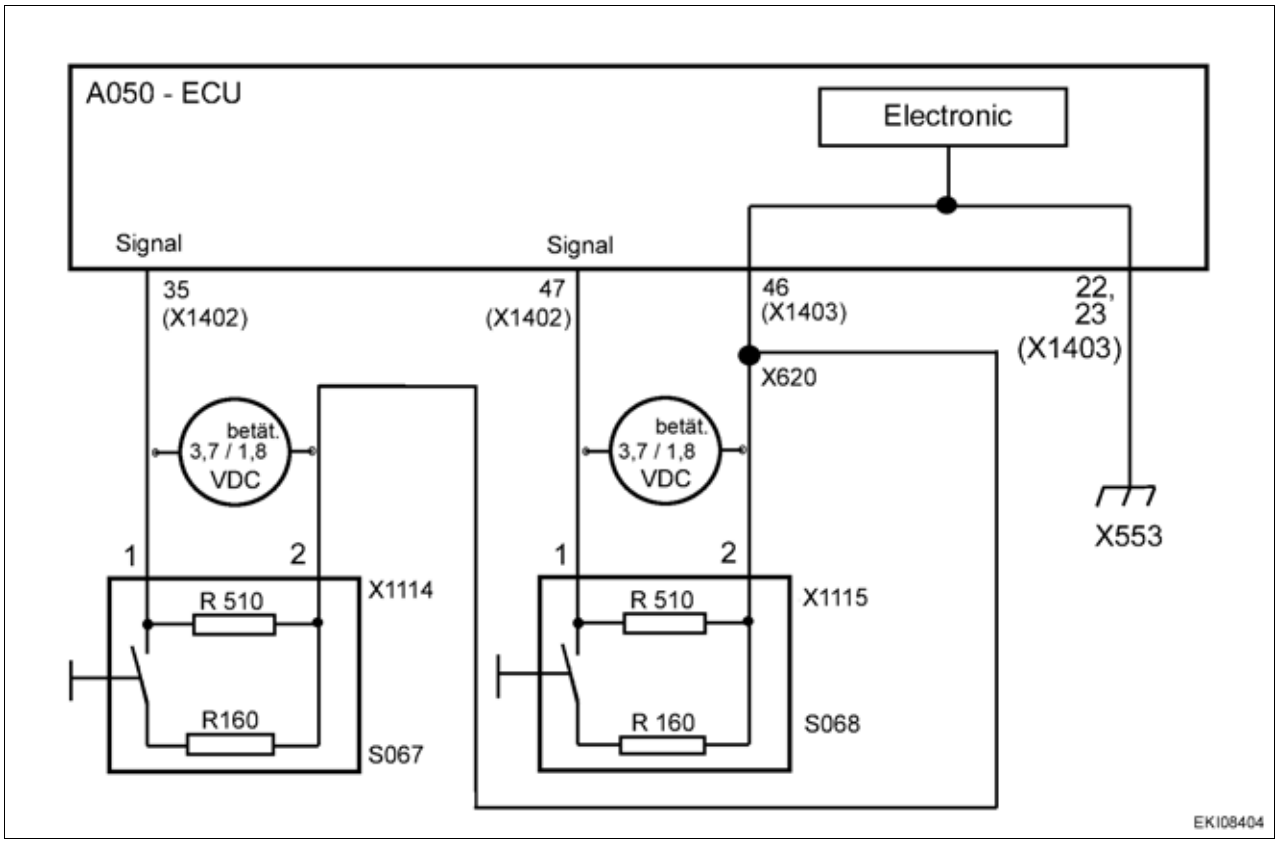


Fig. 419. I001978

Item	Designation	Note
A050 - ECU, basic control unit		
X1402	Separation point on **A050** - ECU, basic control unit	
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 35 (X1402)	Signal, **S067** - Button, valve actuation, external raise	
Pin 47 (X1402)	Signal, **S068** - Button, valve actuation, external lower	
Pin 46 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
S067 - Button, valve actuation, external raise		
X1114	Separation point on S067	
Pin 1	Signal	
Pin 2	Earth	
S068 - Button, valve actuation, external lower		
X1115	Separation point on S068	
Pin 1	Signal	
Pin 2	Earth	
X553 earth pin		

Measuring points and signal values

S067/S068 button	
Pin	**Function**
1	Signal
2	Earth
3	Not assigned



Fig. 420. I001134

Measuring resistance

NOTE: *Connect the adapter cable X899.980.246.205 directly to the component (plug adapter cable into the component only).*
Switch off ignition.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Signal	1	510 ohms	Switch not pressed	
		121 ohms	Switch pressed	
Earth	2			

Measuring signal voltage

NOTE: *Connect the X899.980.246.205 adapter cable directly to the component.*
Switch on ignition.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Signal	1	3.7 VDC	Switch not pressed	
		1.8 VDC	Switch pressed	
Earth	2			

Measuring point on A050 - ECU, basic control unit (X1402 + X1403 separation points)	
Function	**Pin**
Signal, S067 switch	35 (X1402)
Signal, S068 switch	47 (X1402)
Sensor system earth	46 (X1403)
Electronics earth	22 and 23 (on X1403)

NOTE: *see §23*
see §34

Possible cause of fault

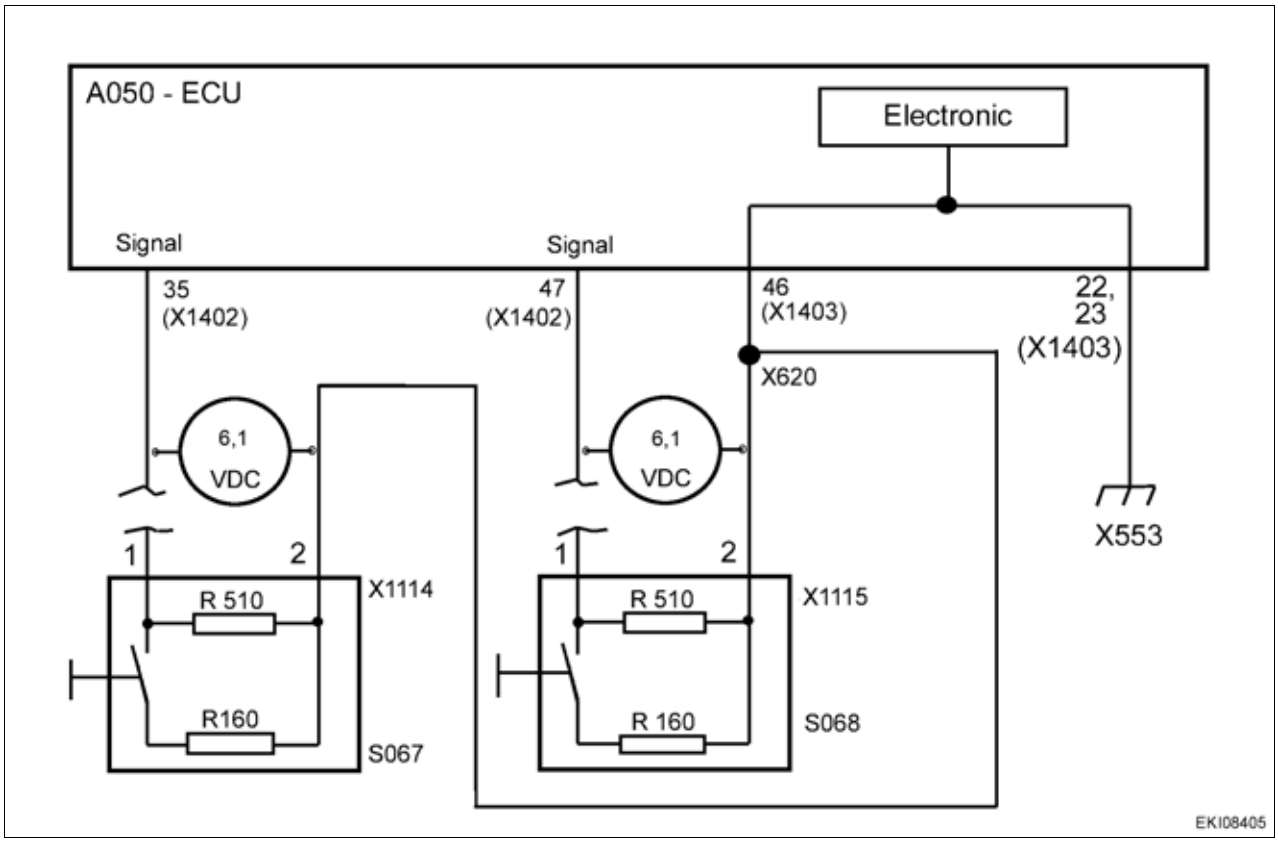


Fig. 421. I001979

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108 S075 switch, guard rail pump flow monitor

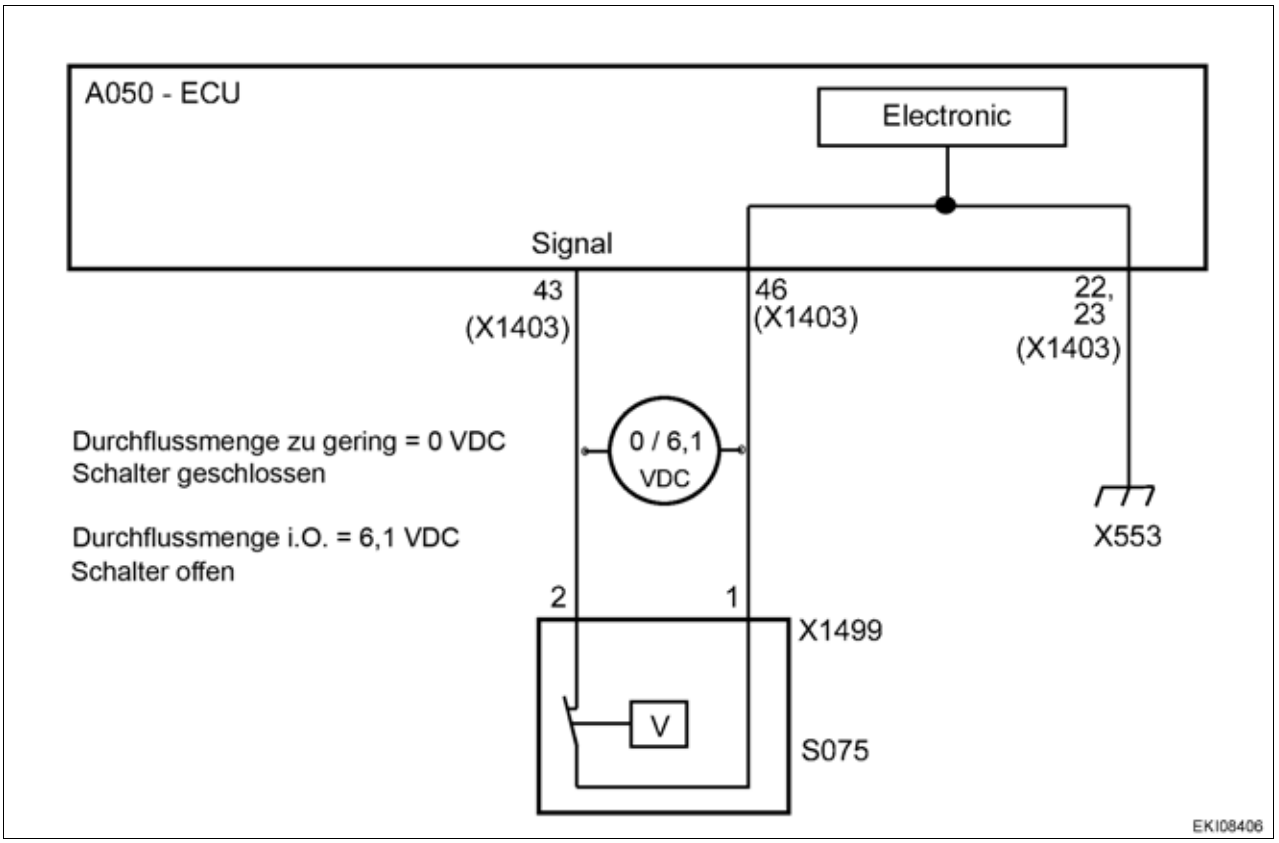


Fig. 422. I001980

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 43 (X1403)	Signal	
Pin 46 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
S075 - Switch, guard rail pump flow monitor		
X1499	Separation point on S075	
Pin 1	Earth	
Pin 2	Signal	– No oil flow present (switch closed) – Oil flow present (switch open)
X553 earth pin		

Measuring points and signal values

S075 flow monitor	
Pin	**Function**
1	Earth
2	Signal

NOTE: *Connect the X899.980.246.204 adapter cable directly to the component*
Switch on ignition.
All readings +/- 10%.



Fig. 423. I001135

Measuring signal voltage

NOTE: *The wheel-driven emergency steering pump (PNL) only pumps oil during forward travel.*
*The **S075** - Switch, guard rail pump flow monitor is only monitored from a speed of 16 km/h.*

To test the S075 flow monitor: **– Jack up all four wheels on the tractor** **– Engage 4WD** **– Hydraulic oil must be at operating temperature (approx. 60°C)**				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
Signal	2	0 VDC	– Ignition ON – No oil flow present (switch closed)	
		6.1 VDC	**During forward travel** – Travel speed above approx.10 Km/h – Oil flow present (switch open)	
Earth	1			

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Signal	43
Sensor system earth	46
Electronics earth	22, 23

NOTE: *see §21*
see §34

Possible cause of fault

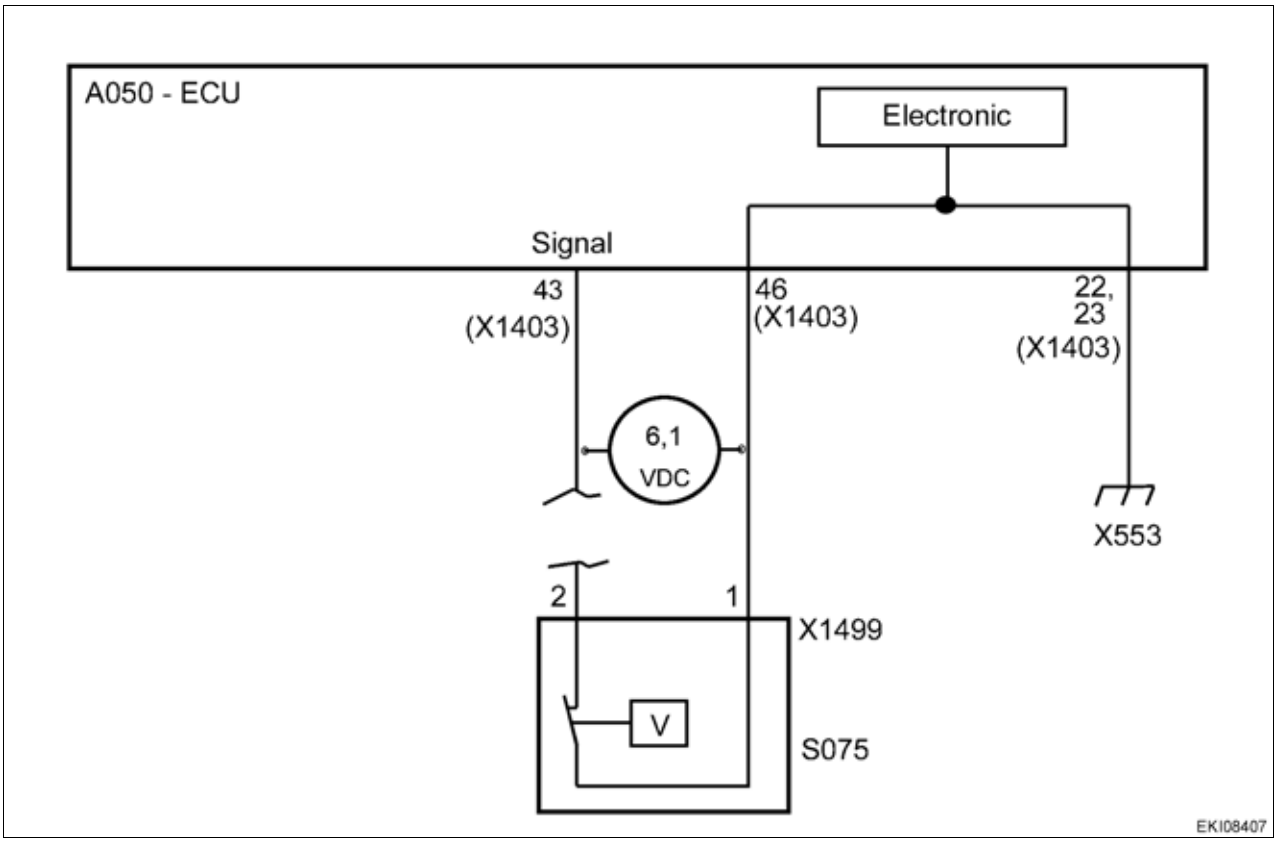


Fig. 424. I001981

Flow direction and torque values at S075 flow monitor

NOTE: *The S075 flow monitor can only be supplied as a complete unit.*

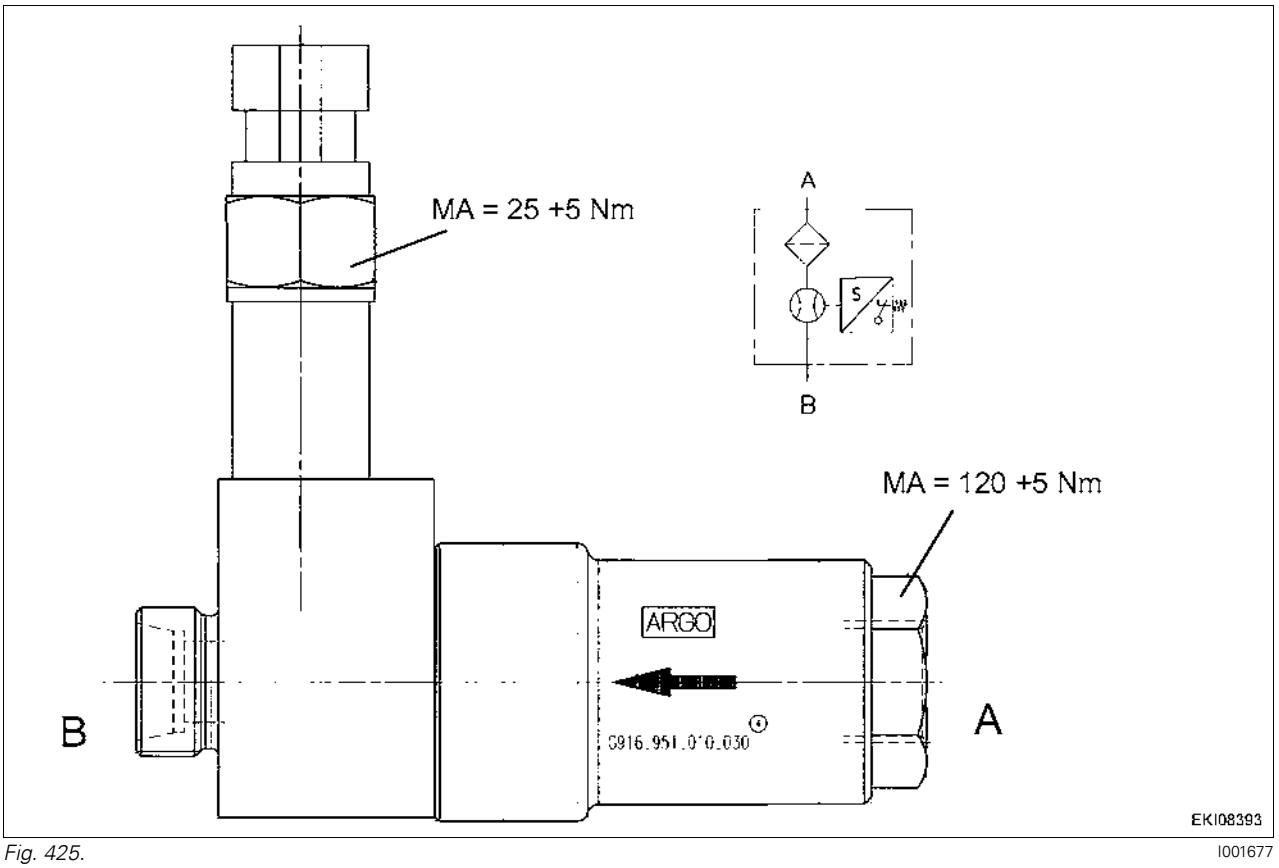


Fig. 425. I001677

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109 S079 steering column/quick reverse switch (area: quick reverse)

Circuit diagram: quick reverse

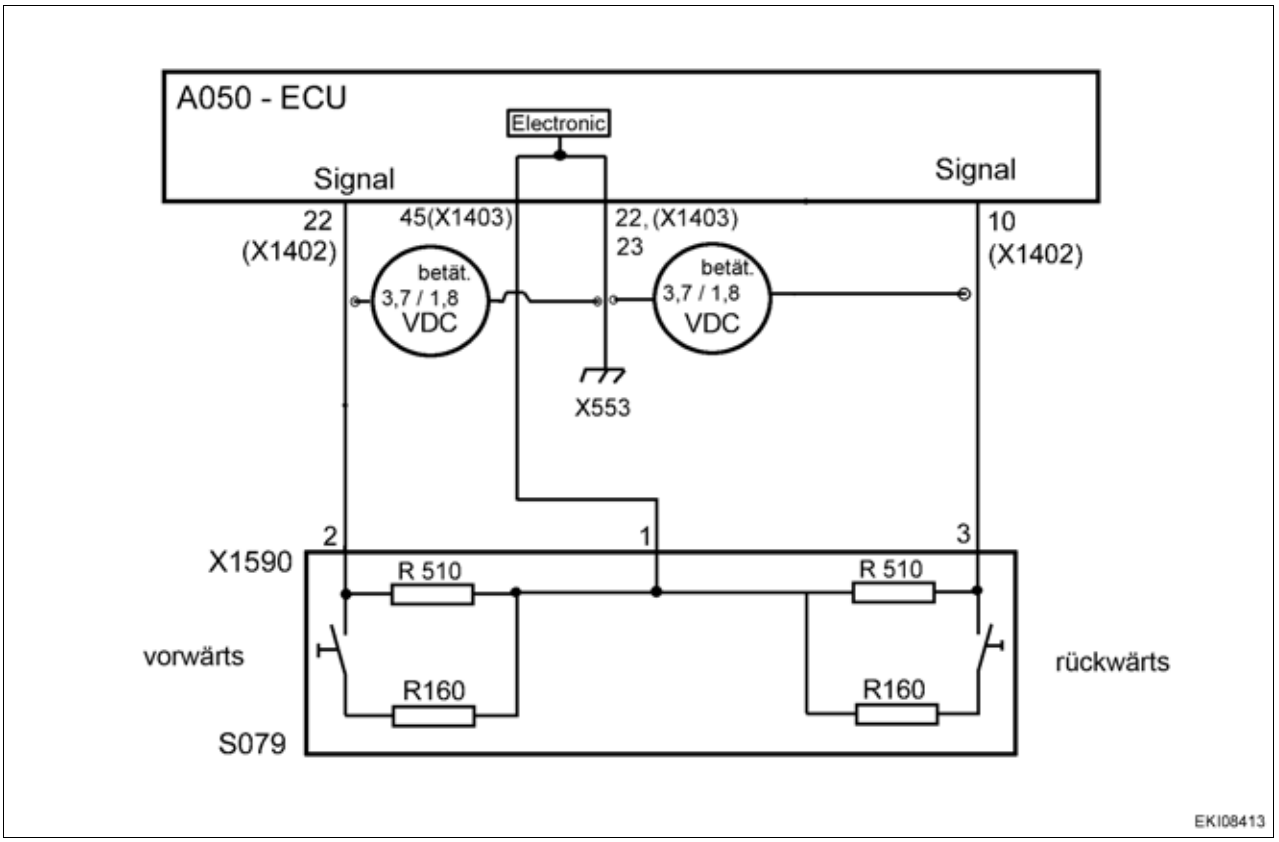


Fig. 426. I001982

Item	Designation	Note
A050 - ECU, basic control unit		
X1402	Separation point on **A050** - ECU, basic control unit	
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 22 (X1402)	"Forwards" signal	
Pin 10 (X1402)	"Backwards" signal	
Pin 46 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
S079 - Switch, steering column		
X1590	"Grey" separation point on S079	
Pin 1	Earth	
Pin 2	"Forwards" signal	
Pin 3	"Backwards" signal	
X553 earth pin		

Measuring points and signal values

S079 switch	
X1590 "grey" separation point	
X1591 "black" separation point	
Pin	**Function**
1 (X1590)	Earth
2 (X1590)	"Forwards" signal
3 (X1590)	"Backwards" signal

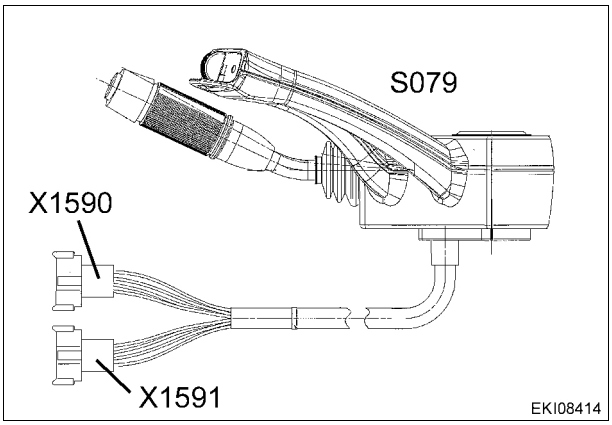


Fig. 427. I001989

Measuring resistance

NOTE: *Switch off ignition.*
Only measure to component.

Test	Pin	Specified value	condition	Possible cause of fault
"Forwards" signal	2	510 ohms	Switch not pressed	
		121 ohms	"Forwards" switch pressed	
Earth	1			

Test	Pin	Specified value	condition	Possible cause of fault
"Backwards" signal	3	510 ohms	Switch not pressed	
		121 ohms	"Backwards" switch actuated	
Earth	1			

Measuring signal voltage

NOTE: *Switch on ignition.*

Test	Pin	Specified value	condition	Possible cause of fault
"Forwards" signal	2	3.7 VDC	Switch not pressed	
		1.8 VDC	"Forwards" switch pressed	
Earth	1			

Test	Pin	Specified value	condition	Possible cause of fault
"Backwards" signal	3	3.7 VDC	Switch not pressed	
		1.8 VDC	"Backwards" switch actuated	
Earth	1			

Measuring point on A050 - ECU, basic control unit (X1402 + X1403 separation points)	
Function	**Pin**
"Forwards" signal	22 (X1402)
"Backwards" signal	10 (X1402)
Sensor system earth	46 (X1403)
Electronics earth	22, 23 (X1403)

NOTE: *see §31*
see §34

Possible cause of fault

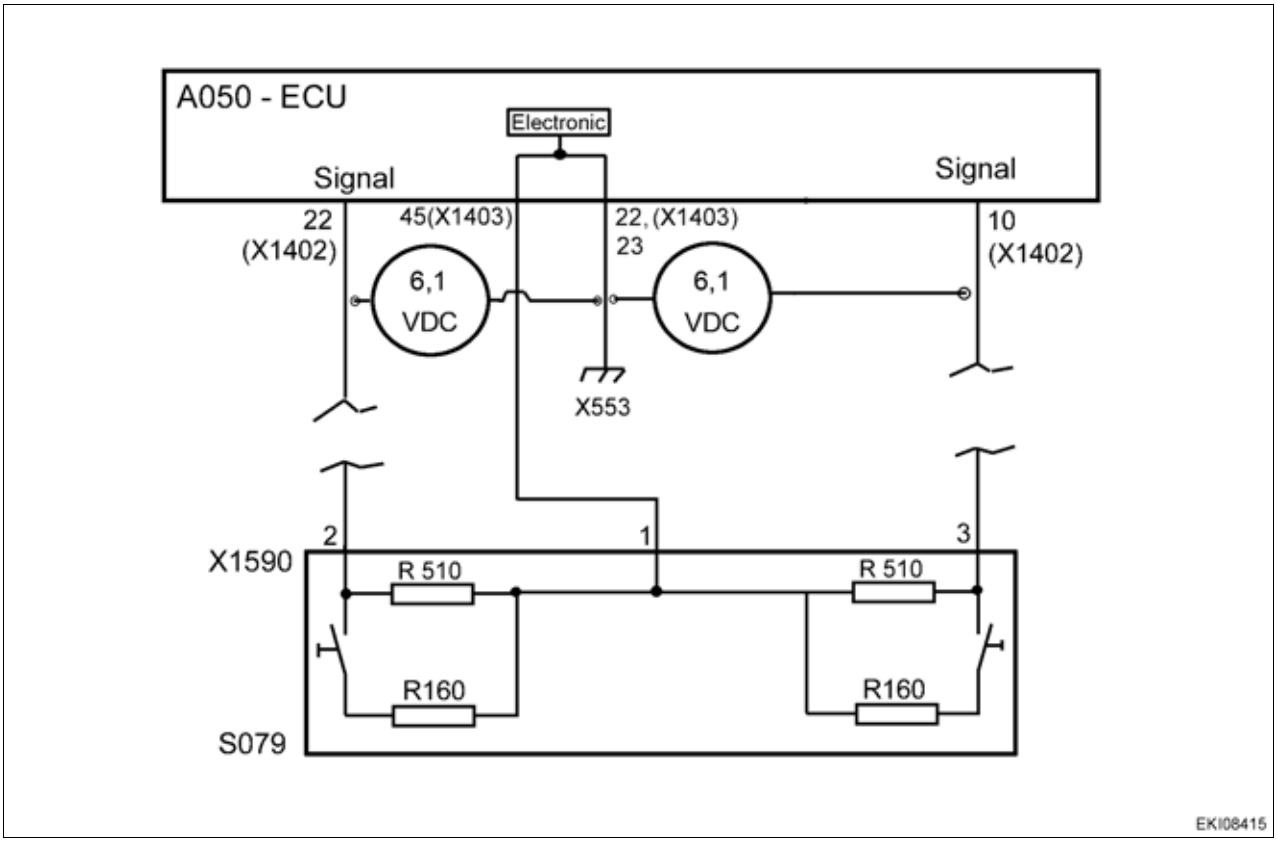


Fig. 428. I001983

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110 S079 steering column/quick reverse switch (area: steering column)

Circuit diagram: steering column switch

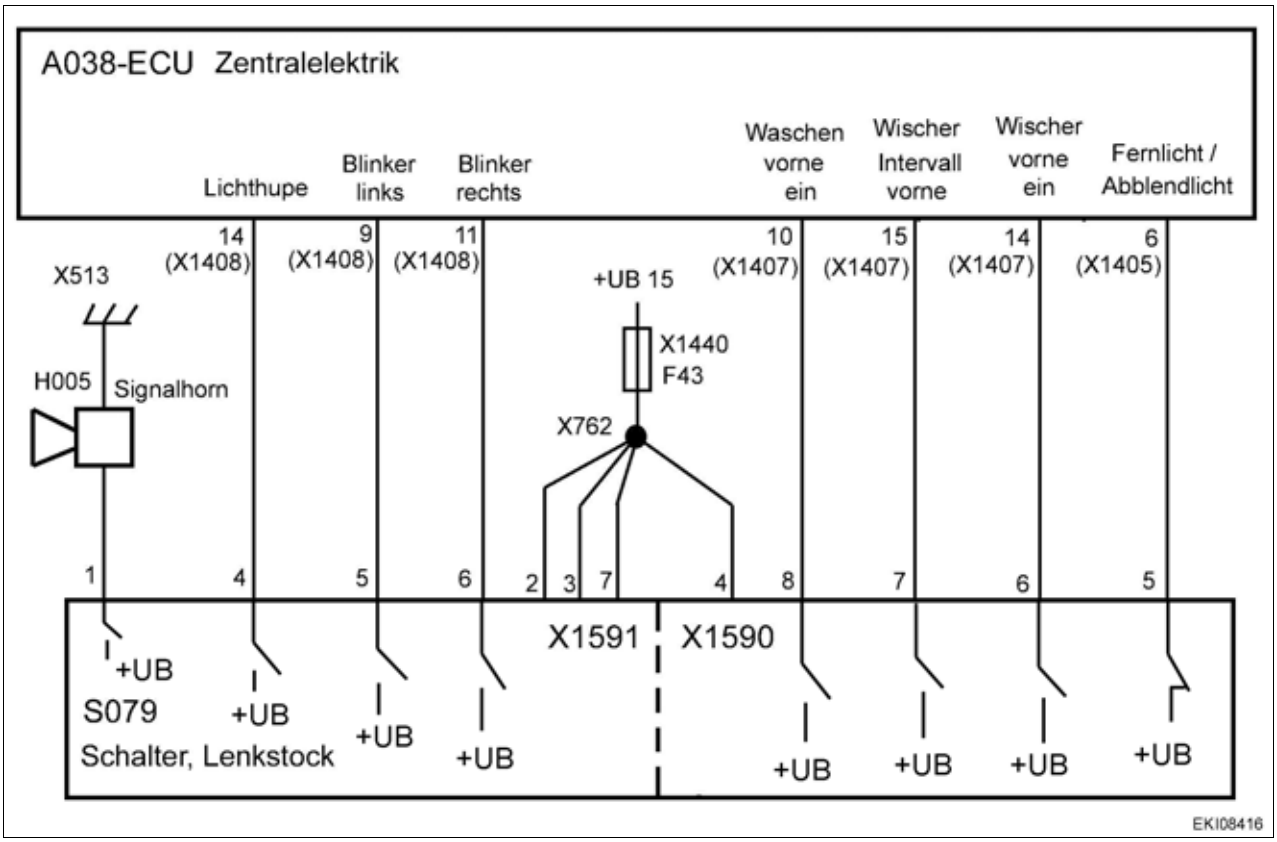


Fig. 429. I002252

Item	Designation	Note
A038 - ECU, central electrical system		
X1405	Separation point on A038	
X1407	Separation point on A038	
X1408	Separation point on A038	
Pin 6 (X1405)	Main beam/dipped beam	
Pin 10 (X1407)	Front wash ON	
Pin 14 (X1407)	Front wiper ON	
Pin 15 (X1407)	Front wiper intermittent	
Pin 9 (X1408)	Left direction indicator	
Pin 11 (X1408)	Right direction indicator	
Pin 14 (X1408)	Main light flash	
S079 - Switch, steering column		
X1590	"Grey" separation point on S079	
X1591	"Black" separation point on S079	
Pin 4 (X1590)	+ supply (+ UB 15)	
Pin 5 (X1590)	Main beam/dipped beam	
Pin 6 (X1590)	Front wiper ON	
Pin 7 (X1590)	Front wiper intermittent	
Pin 8 (X1590)	Front wash ON	

Item	Designation	Note
Pin 1 (X1591)	H005 horn	
Pin 2 (X1591)	+ supply (+ UB 15)	
Pin 3 (X1591)	+ supply (+ UB 15)	
Pin 4 (X1591)	Main light flash	
Pin 5 (X1591)	Left direction indicator	
Pin 6 (X1591)	Right direction indicator	
H005	Horn	
X513	Earth pin	
X1440	Fuse holder	Fuse F43

Measuring points and signal values

S079 - Switch, steering column Note: for assignment of separation points, see above.	
Pin	**Function**
X1590	"Grey" separation point
X1591	"Black" separation point

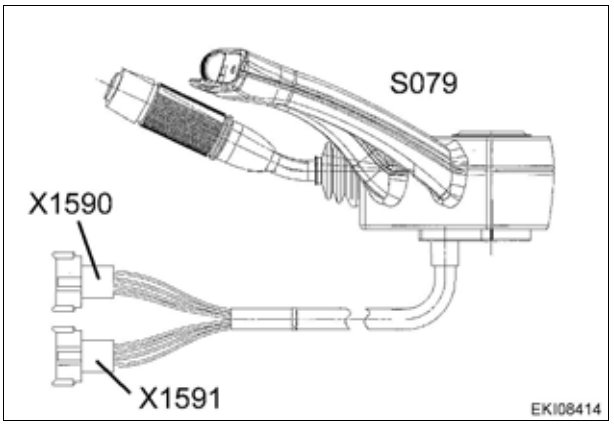


Fig. 430. I001723

Measuring +supply and signal voltage

Prerequisite for this measurement:

– Use the **vehicle earth** to **earth**

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	4 (X1590)	12 VDC	Ignition ON.	Fuse F43 (X1440 fuse holder)
	2 (X1591)			
	3 (X1591)			
	7 (X1591)			
Vehicle earth				

Test	Pin	Specified value	condition	Possible cause of fault
"Main beam/dipped beam" signal	5 (X1590)	14 VDC	Engine is running, Dipped beam (56b) ON	If a break occurs in the signal line, the **A038** - ECU, central electrical system switches to dipped beam automatically after a key reset (ignition ON/OFF). This means: 1.7 VDC = dipped beam
		1.7 VDC not loadable	Engine is running, Main beam (56a) ON	

Test	Pin	Specified value	condition	Possible cause of fault
"Front wipers ON" signal	6 (X1590)	1.7 VDC not loadable	Wiper OFF	
		12 VDC	Wiper ON	
"Front wiper intermittent" signal	7 (X1590)	1.7 VDC not loadable	Wiper intermittent OFF	
		12 VDC	Wipers intermittent ON	
"Front wash ON" signal	8 (X1590)	1.7 VDC not loadable	Front wash OFF	
		12 VDC	Front wash ON	
"H005 horn" signal	1 (X1591)	0 VDC	Horn OFF	
		12 VDC	Horn ON	
"Main light flash" signal	4 (X1591)	1.7 VDC not loadable	Main light flash OFF	
		12 VDC	Main light flash ON	
"Left direction indicator" signal	5 (X1591)	1.7 VDC not loadable	Left direction indicator OFF	
		12 VDC	Left direction indicator ON	
"Right direction indicator" signal	6 (X1591)	1.7 VDC not loadable	Right direction indicator OFF	
		12 VDC	Right direction indicator ON	
Vehicle earth				

Measuring point on the A038 - ECU, central electrical system	
Function	**Pin**
Main beam/dipped beam	B6 (X1405)
Front wash	D10 (X1407)
Front wiper ON	D14 (X1407)
Front wiper intermittent	D15 (X1407)
Left direction indicator	E9 (X1408)
Right direction indicator	E11 (X1408)
Main light flash	E14 (X1408)

NOTE: *see §9*
see §11
see §16

NOTE: *When the switch (S079 steering column switch) is open, a voltage of approx. 1.7 VDC is present at the **A038** - ECU, central electrical system.*
When the switch (S079 steering column switch) is closed, a voltage of approx. 12 VDC is present.
The A038 ECU, central electrical system determines which function the driver has selected by the voltage level.

111 S080 switch, hand brake

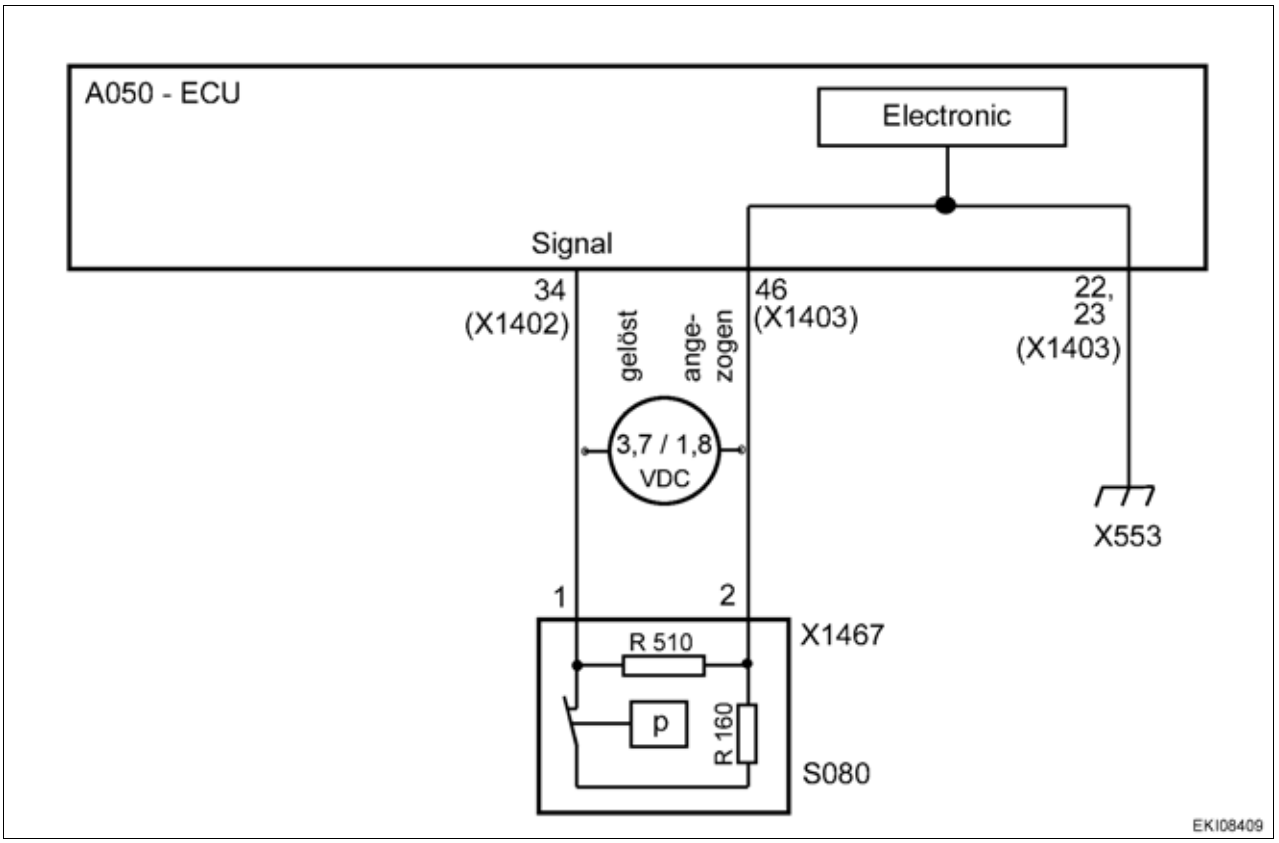


Fig. 431. I001984

Item	Designation	Note
A050 - ECU, basic control unit		
X1402	Separation point on **A050** - ECU, basic control unit	
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 34 (X1402)	Signal	
Pin 46 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
S080 - Switch, hand brake		
X1467	Separation point on S080	
Pin 1	Signal	
Pin 2	Earth	
X553 earth pin		

Measuring points and signal values

S080 switch	
Pin	**Function**
1	Signal
2	Earth

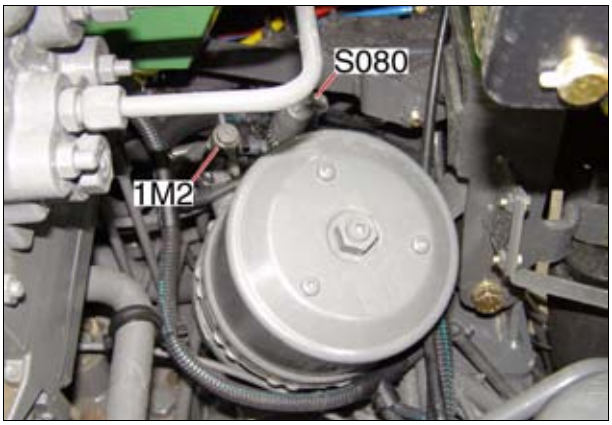


Fig. 432. I001138

Measuring resistance

NOTE: *Connect the adapter cable X899.980.246.204 directly to the component (plug adapter cable into the component only).*
Switch off ignition.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Signal	1	121 ohms	Hand brake applied	**Note:** The switching point for the **S080** - Switch, hand brake is 3,5 bar. The parking brake only releases at 6,5 bar
		510 ohms	Hand brake released	
Earth	2			

Measuring signal voltage

NOTE: *Connect the X899.980.246.204 adapter cable directly to the component*
Switch on ignition.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Signal	1	1.8 VDC	Hand brake applied	**Note:** The switching point for the **S080** - Switch, hand brake is 3,5 bar. The parking brake only releases at 6,5 bar
		3.7 VDC	Hand brake released	
Earth	2			

Measuring point on A050 - ECU, basic control unit (X1402 + X1403 separation points)	
Function	**Pin**
Signal	34 (X1402)
Sensor system earth	46 (X1403)
Electronics earth	22, 23 (X1403)

NOTE: *see §32*
see §34

Possible cause of fault

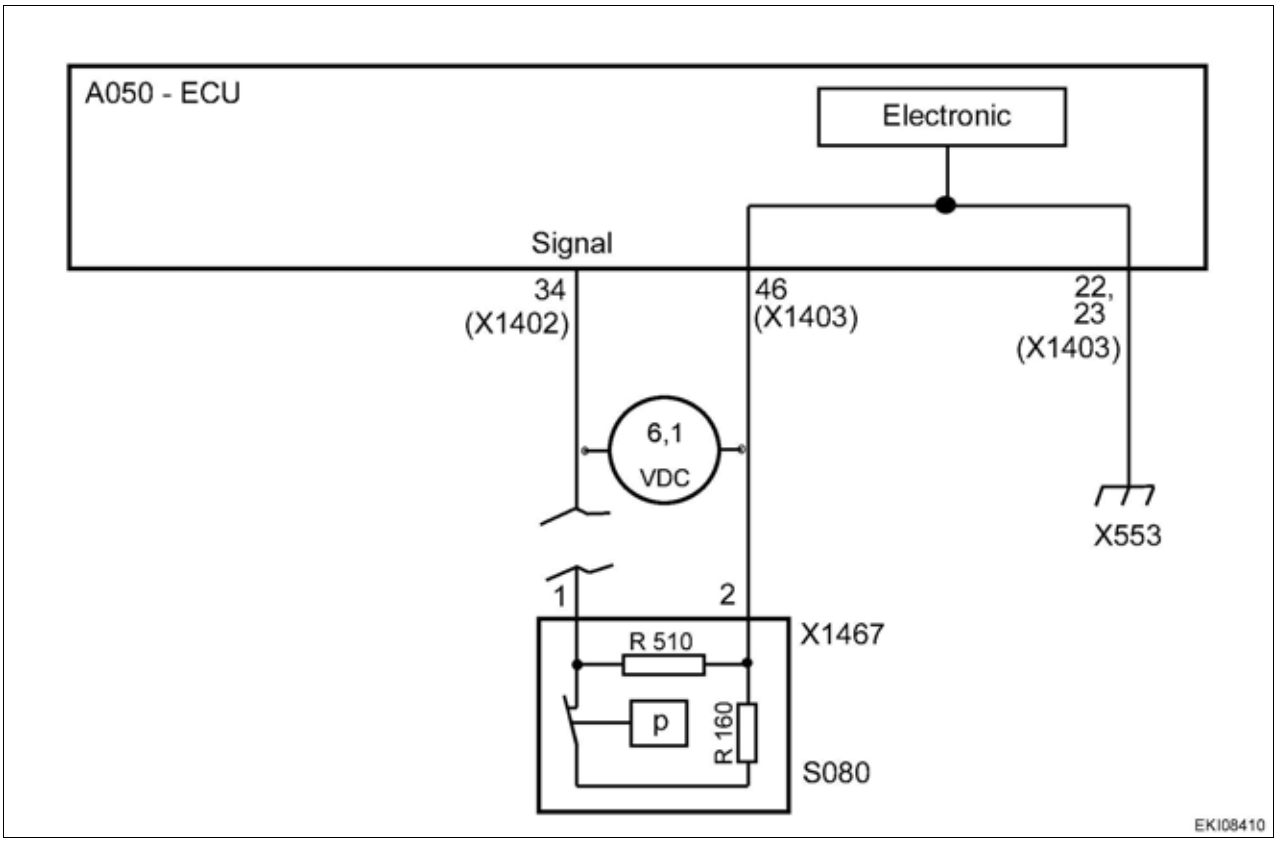


Fig. 433. I001991

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112 S085 switch, reverse operation (recognition: steering column, top)

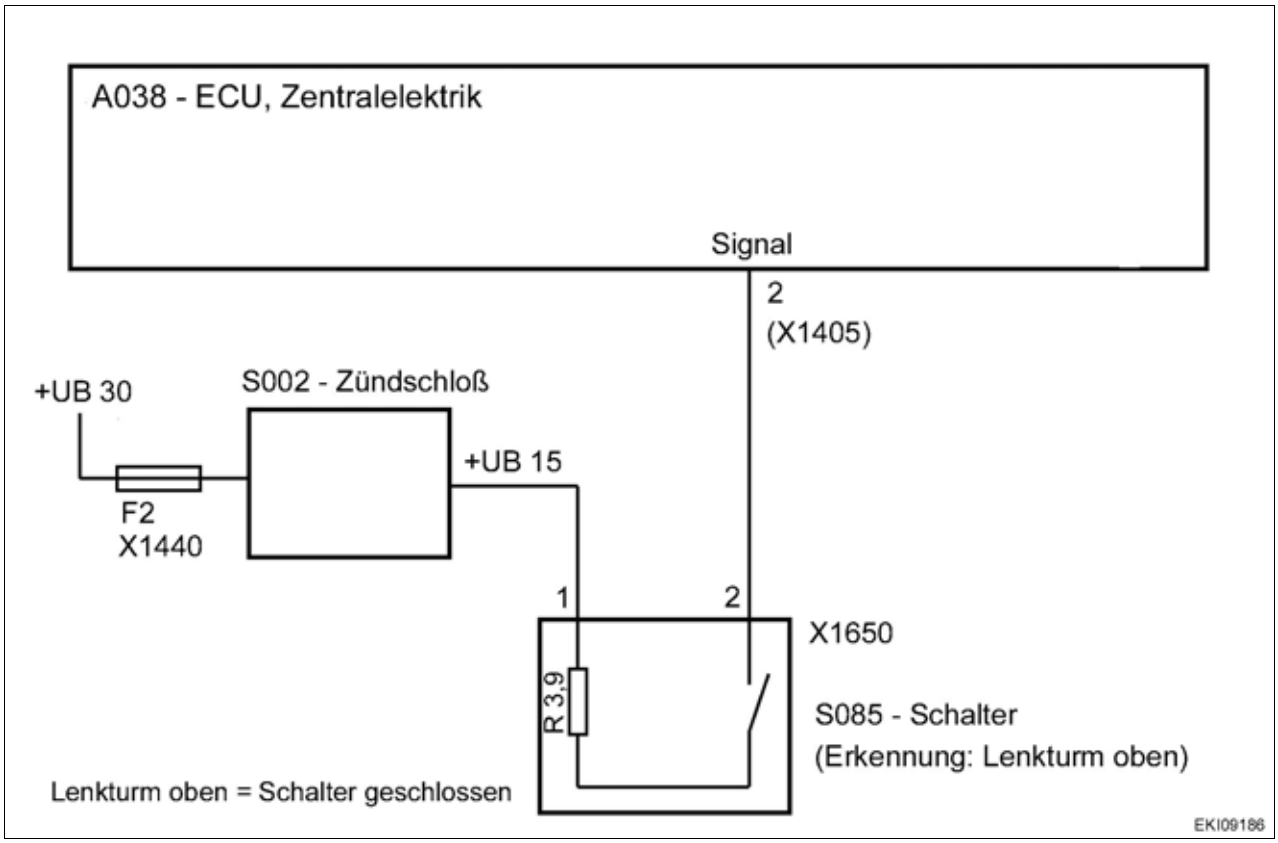


Fig. 434. I004835

Measuring points and signal values

Solenoid switch (contact)
(H 312.100.070.500)

Solenoid is upstream of the solenoid switch:
Switch closed

Solenoid removed from the solenoid switch:
Switch open

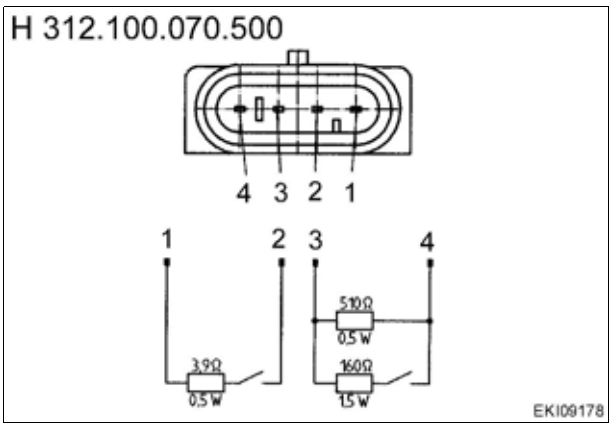


Fig. 435. I004821

Measuring resistance (ohms)

NOTE: *Measure pins directly on the component*
Switch off ignition.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Signal	2	Infinite ohms	Steering column bottom (solenoid removed from switch) (switch open)	
		3.9 ohms	Steering column raised (solenoid is upstream of switch) (switch closed)	
Earth	1			

Measuring signal voltages

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see §16*

Prerequisite for this measurement:

- Use the **vehicle earth** to **earth**
- Compressed air system filled
- Engine OFF
- Switch on ignition.
- Hand brake applied

				Break in wiring	
Pin	**description**	**Signal type/condition**	**Signal**	**Signal from ECU**	**Signal from compo-nent**
S085 switch, reverse operation (detection: steering column, top)					
B2 (X1405)	**Recognition S085 switch (steering col-umn top)**	Steering column bottom (solenoid removed from switch) (switch open)	0 VDC	0 VDC	0 VDC
		Steering column raised (solenoid is upstream of switch) (switch closed)	approx. 12 VDC	0 VDC	approx. 12 VDC

NOTE: *see §15*
see §1

113 S086/S087 right/left brake wear switch

Circuit diagram

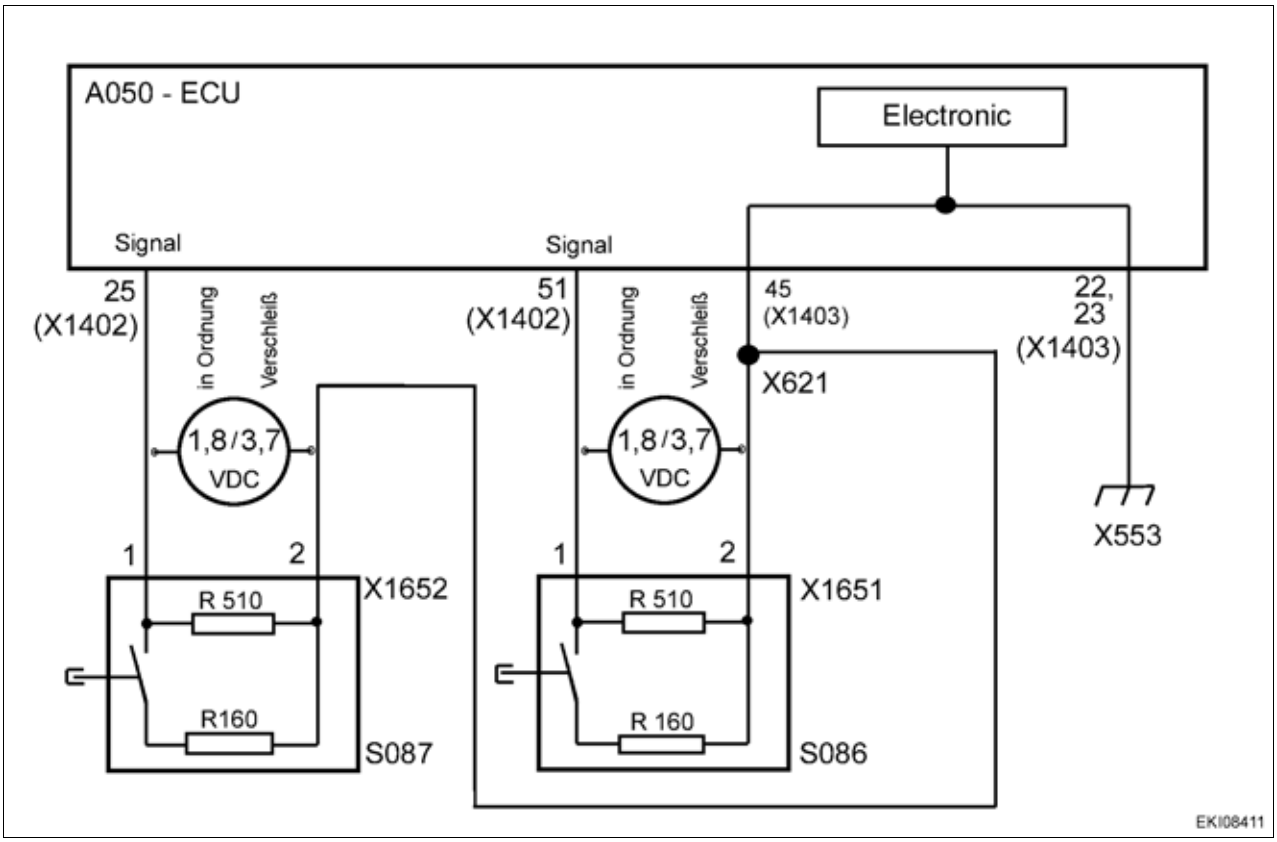


Fig. 436. I001992

Item	Designation	Note
A050 - ECU, basic control unit		
X1402	Separation point on **A050** - ECU, basic control unit	
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 25 (X1402)	Signal from **S087** - Switch, brake wearing, left	
Pin 51 X1402)	Signal from **S086** - Switch, brake wearing, right	
Pin 46 (X1403)	Sensor system earth	
Pins 22 and 23 (X1403)	Electronics earth	
S086 - Switch, brake wearing, right		
X1651	Separation point on S086	
Pin 1	Signal	
Pin 2	Earth	
S087 - Switch, brake wearing, left		
X1652	Separation point on S087	
Pin 1	Signal	
Pin 2	Earth	
X553 earth pin		
X621 sensor system earth connector		

Measuring points and signal values

S086/S087 switch	
Pin	**Function**
1	Signal
2	Earth



Fig. 437. I001140

Measuring resistance

NOTE: *Connect the adapter cable X899.980.246.204 directly to the component (plug adapter cable directly into the component).*
Switch off ignition.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Signal	1	121 ohms	**Brake wear OK** (switch closed)	
		510 ohms	**Brake wear too high** (switch open)	
Earth	2			

Measuring signal voltage

NOTE: *Connect the X899.980.246.204 adapter cable directly to the component*
Switch on ignition.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Signal	1	1.8 VDC	**Brake wear OK** (switch closed)	
		3.7 VDC	**Brake wear too high** (switch open)	
Earth	2			

Measuring point on A050 - ECU, basic control unit (X1402 + X1403 separation points)	
Function	**Pin**
Signal from S086	51 (X1402)
Signal from S087	25 (X1402)
Sensor system earth	46 (X1403)
Electronics earth	22, 23 (X1403)

NOTE: *see §32*
see §34

Possible cause of fault

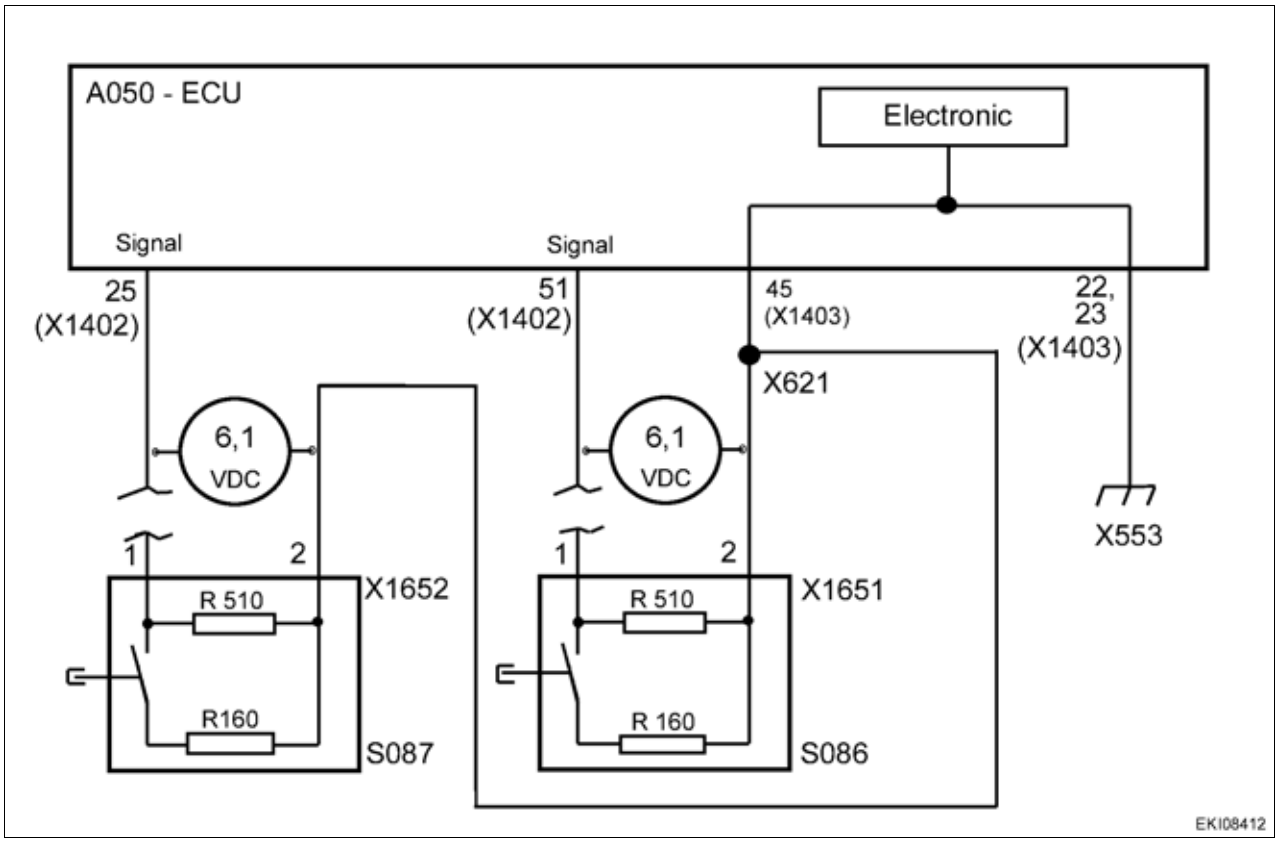


Fig. 438. I001993

Adjusting the S086/S087 switch
see §2
see §3

114 X007 implement socket "black"

X007 implement socket "black"

The X007 implement socket (7-pin) delivers signals for the operation of towed and mounted implements.
Example: Speed signals for the operation of a sprayer computer.



Cab, C-pillar, top right



Fig. 439. I001191

Plug an adapter cable (self-made with G312.810.210.030 plug) into the X007 implement socket.
The measurement can also be carried out without an adapter cable, though measurement errors may result due to the small socket pins.



Fig. 440. I002749

Pin assignment on the X007 implement socket

1 = actual road speed (A011 radar sensor, optional)
(130 pulses per metre travelled)

Speed	Voltage level (U)
lower than 0.1 km/h	14 VDC
higher than 0.1 km/h	approx. 6.5 VDC (UBatt/2)

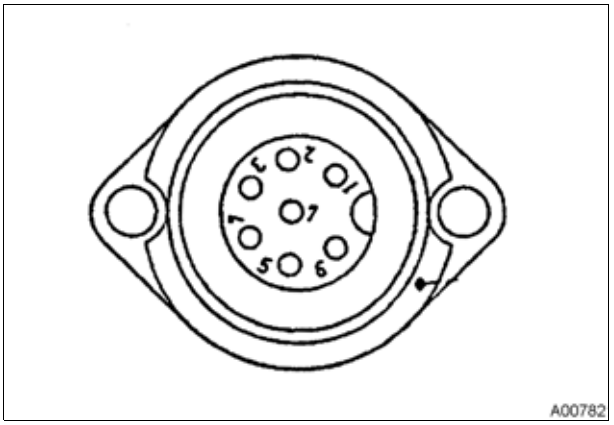


Fig. 441. I002748

2 = theoretical road speed (Transmission signal)
(130 pulses per metre travelled)

Speed	Voltage level (U)
lower than 0.1 km/h	14 VDC
higher than 0.1 km/h	approx. 6.5 VDC (UBatt/2)

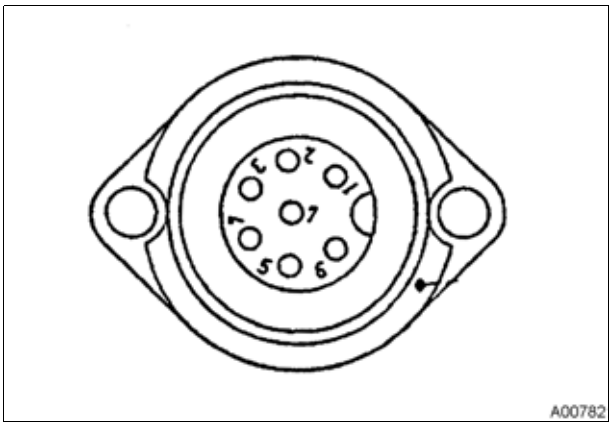


Fig. 442. I002748

3 = rear PTO speed
(40 pulses per PTO revolution)

Rear PTO	Voltage level (U)
Rear PTO level pre-selected Rear PTO disengaged (speed = 0 U/min)	14 VDC
Rear PTO level pre-selected Rear PTO engaged (speed greater than 0 U/min)	approx. 6.5 VDC (UBatt/2)

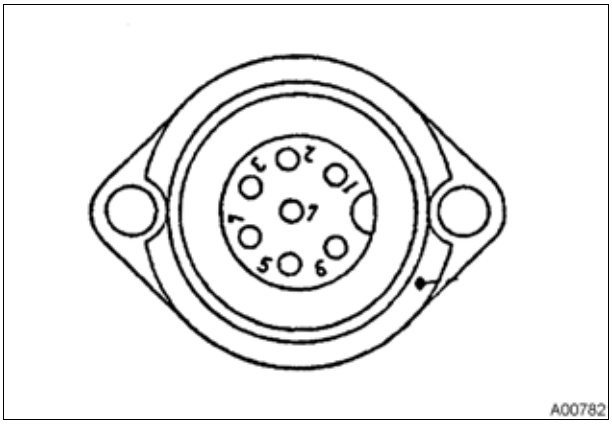


Fig. 443. I002748

4 = linkage status (rear power lift)

Quick lift switch (rear power lift)	Voltage level (U)
Lower (control, float)	0 VDC
Stop	0 VDC
Raise	14 VDC

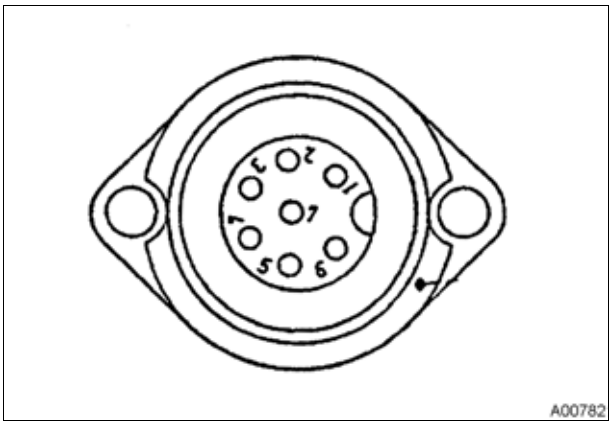


Fig. 444. I002748

5 = linkage status (rear power lift)

Linkage (rear power lift)	Voltage level (U)
Lower limit position:	0 VDC
Upper limit position:	10 VDC

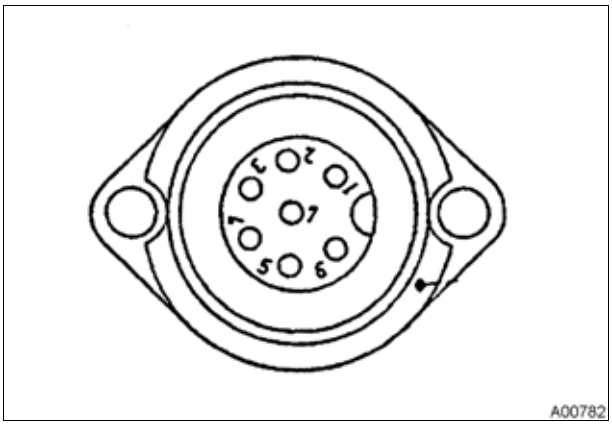


Fig. 445. I002748

6 = +supply (+UB 15)
Fuse (F40) on the X1440 fuse holder

	Voltage level (U)
Ignition OFF	0 VDC
Ignition ON.	10 VDC

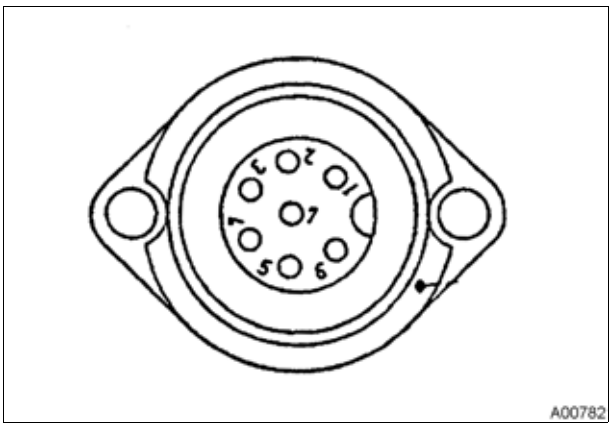


Fig. 446. I002748

7 = earth

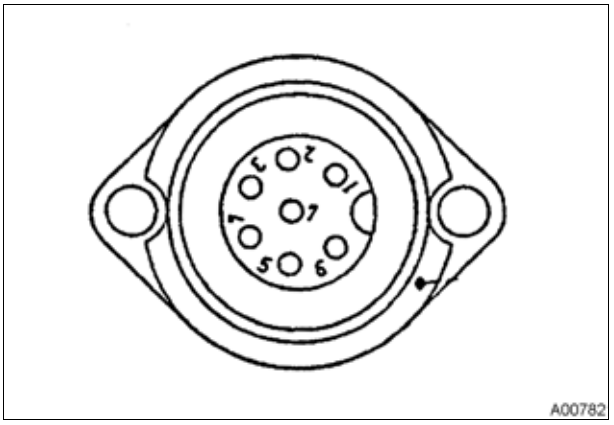


Fig. 447. I002748

NOTE: *see §1*

115 X008 counter input (onboard computer) "blue"

X008 counter input "blue"

The X008 counter input "blue" is 7-pin, of which only pins 1 and 2 are assigned.

A solenoid switch (event counter) is fitted to the mounted implement.
An event is counted when the solenoid switch closes.



Fig. 448. I001191

Pin assignment on the X008 counter input "blue"

1 = counter input
2 = earth
3 ... 7 = not assigned

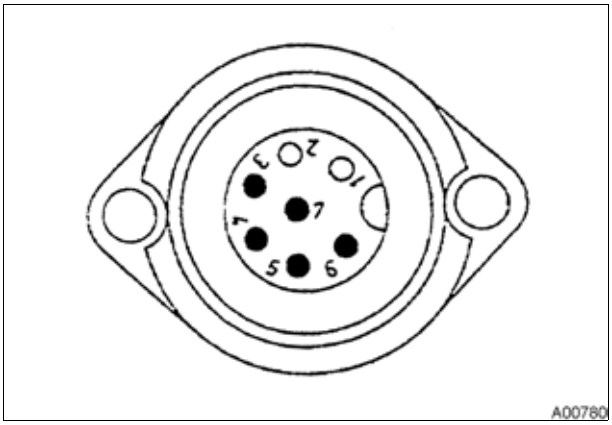


Fig. 449. I002753

Checking the event counter in the Vario terminal

Overview image of the Vario terminal
Press F6.

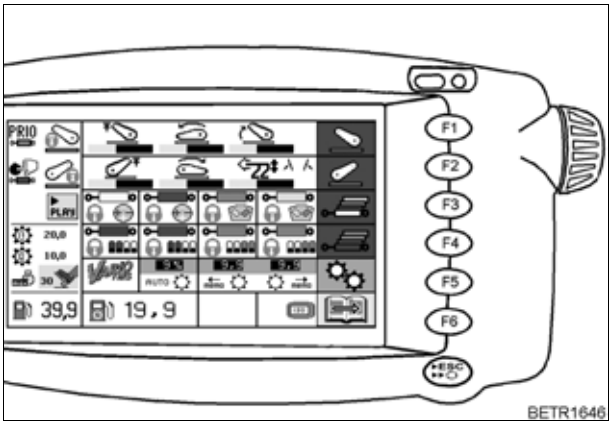


Fig. 450. I002750

The sub-menu is displayed.
Press F1.

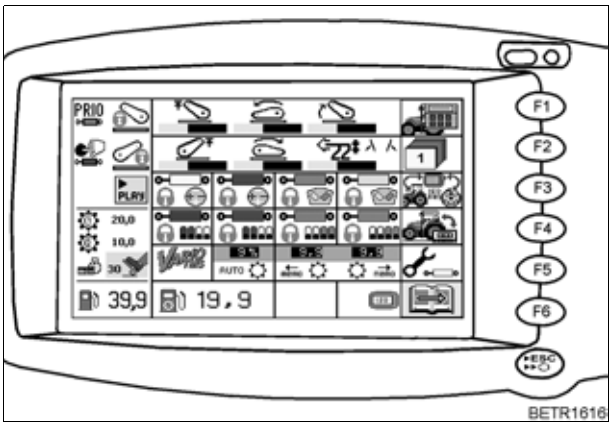


Fig. 451. I002751

The "hectare counter" is displayed.
Press F5.
The event counter is active (green).

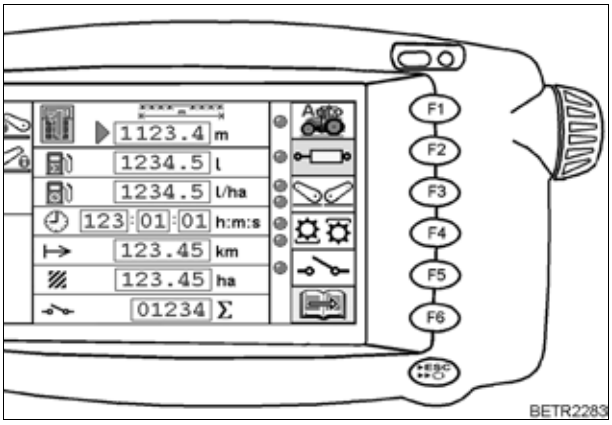


Fig. 452. I002752

Connection cable with external counter (solenoid switch)
Accessory number: 0071.023.100.000

1x cable set, counter = H916.970.010.010
1x solenoid switch = H312.100.070.500
1x solenoid = X830.120.050.000



Fig. 453. I002755

Connect the connection cable to the X008 counter input.
Switch on ignition.
Pass a magnet over the solenoid switch.
Switching impulses are displayed in the "hectare counter" (A007 instrument panel).

The test can also be carried out using a bridge mounted between pins 1 and 2 on the X018 counter input.

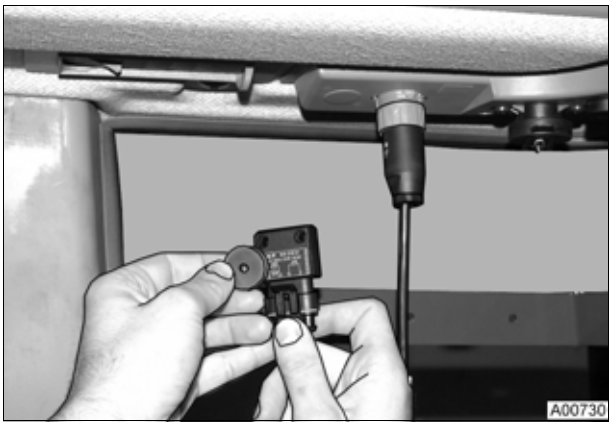


Fig. 454. I002754

Measuring point on the A050 - ECU, basic control unit (X1402 separation point)	
Function	**Pin**
Counter input	34

NOTE: *see §34*

116 X015 external control, rear EPC (external position sensor)

Circuit diagram

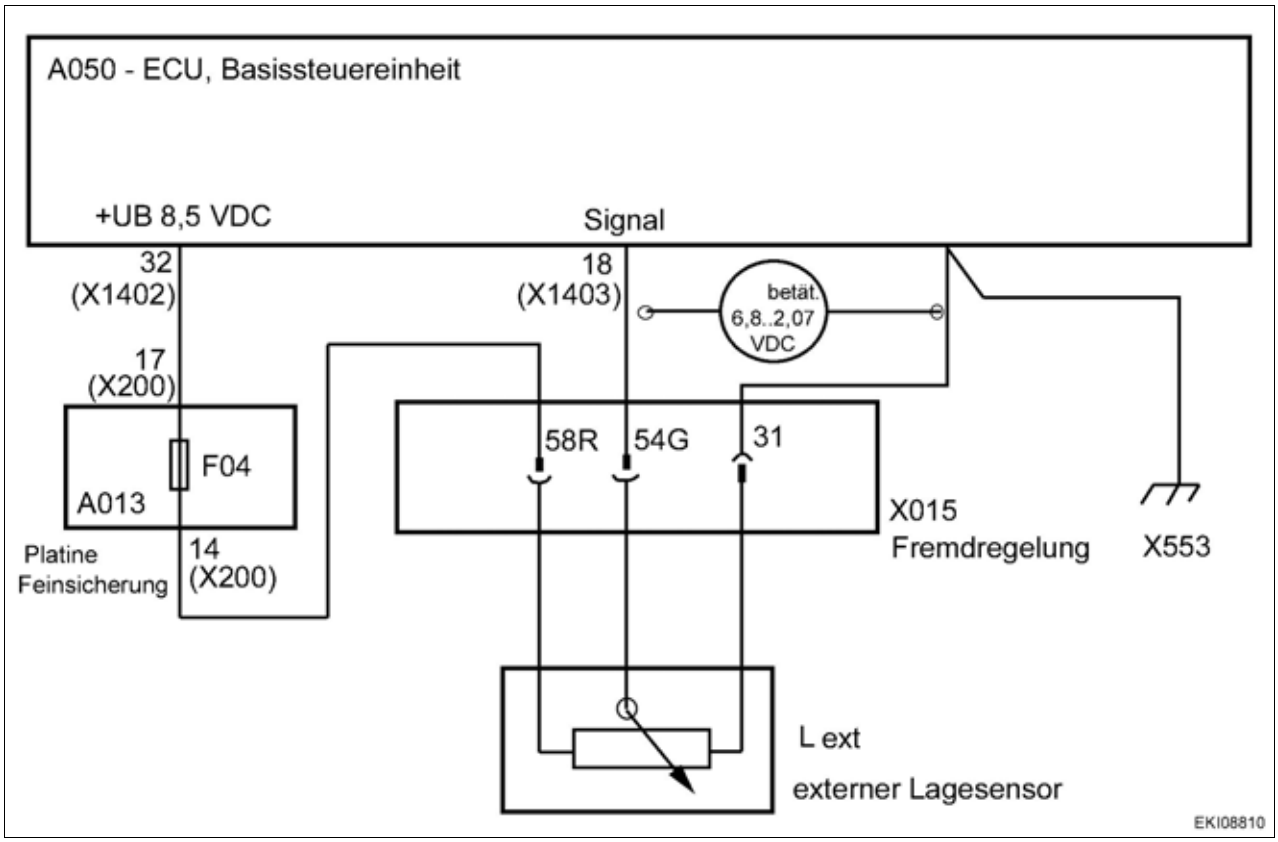


Fig. 455. I002824

Item	Designation	Note
A013 - PCB, microfuses **(microfuse no. 4)**		
X200	Separation point on **A013** - PCB, microfuses	
Pin 17	+ supply for the **A013** - PCB, microfuses (8.5 VDC)	Switch on ignition.
Pin 14	+supply for the external position sensor	Switch on ignition.
A050 - ECU, basic control unit		
X1402	Separation point on **A050** - ECU, basic control unit	
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 32 (to X1402)	+ supply for the **A013** - PCB, microfuses (8.5 VDC)	Switch on ignition.
Pin 18 (on X1403)	Signal	
Lext. - external position sensor		
Pin 1	+ supply (8.5 VDC)	Switch on ignition.
Pin 2	Signal	
Pin 3	Earth	
X015 external control socket		
Pin 31	Earth	
Pin 54G	Signal	

Item	Designation	Note
Pin 58R	+ supply (8.5 VDC)	Switch on ignition.
X553 earth pin		

Using multimeter (voltmeter), check voltage level at socket

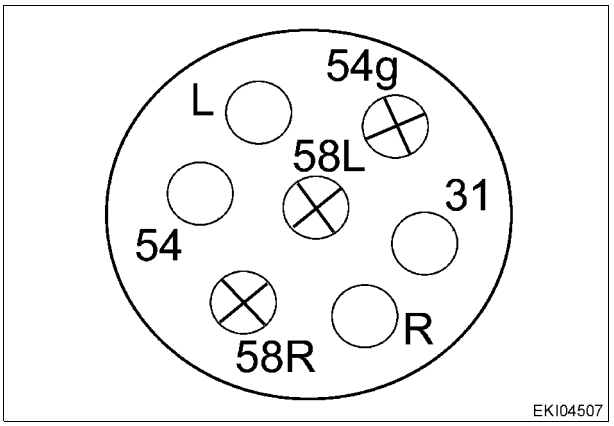


Fig. 456. I002779

+supply for the external position sensor
Ignition ON.

Pin	Voltage level (U)
58R	8.5 VDC
31 (earth)	

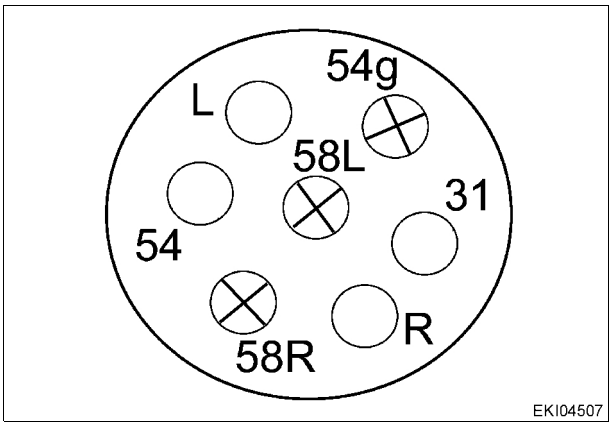


Fig. 457. I002779

Signal from the external position sensor
Ignition ON.

Pin	Voltage level (U)
54G	6.8 ... 2.07 VDC (press plunger in, voltage decreases) –> rear power lift raises
31 (earth)	2.07 ... 6.8 VDC (release plunger, voltage rises) –> rear power lift lowers

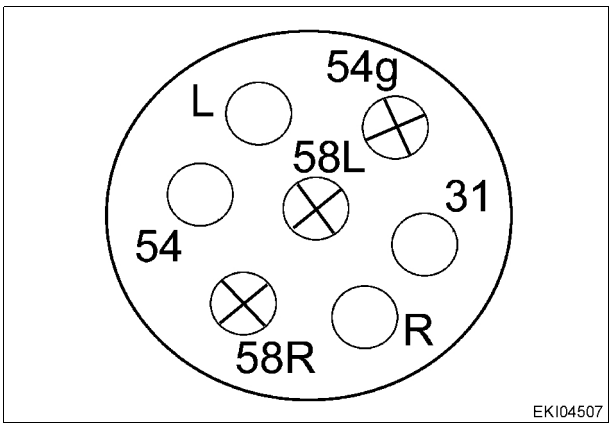


Fig. 458. I002779

NOTE: *see §22*
see §34
Bedienung und Funktion der Fremdregelung

117 X015 external control (range: 3rd and 4th hydraulic circuit) (professional version only)

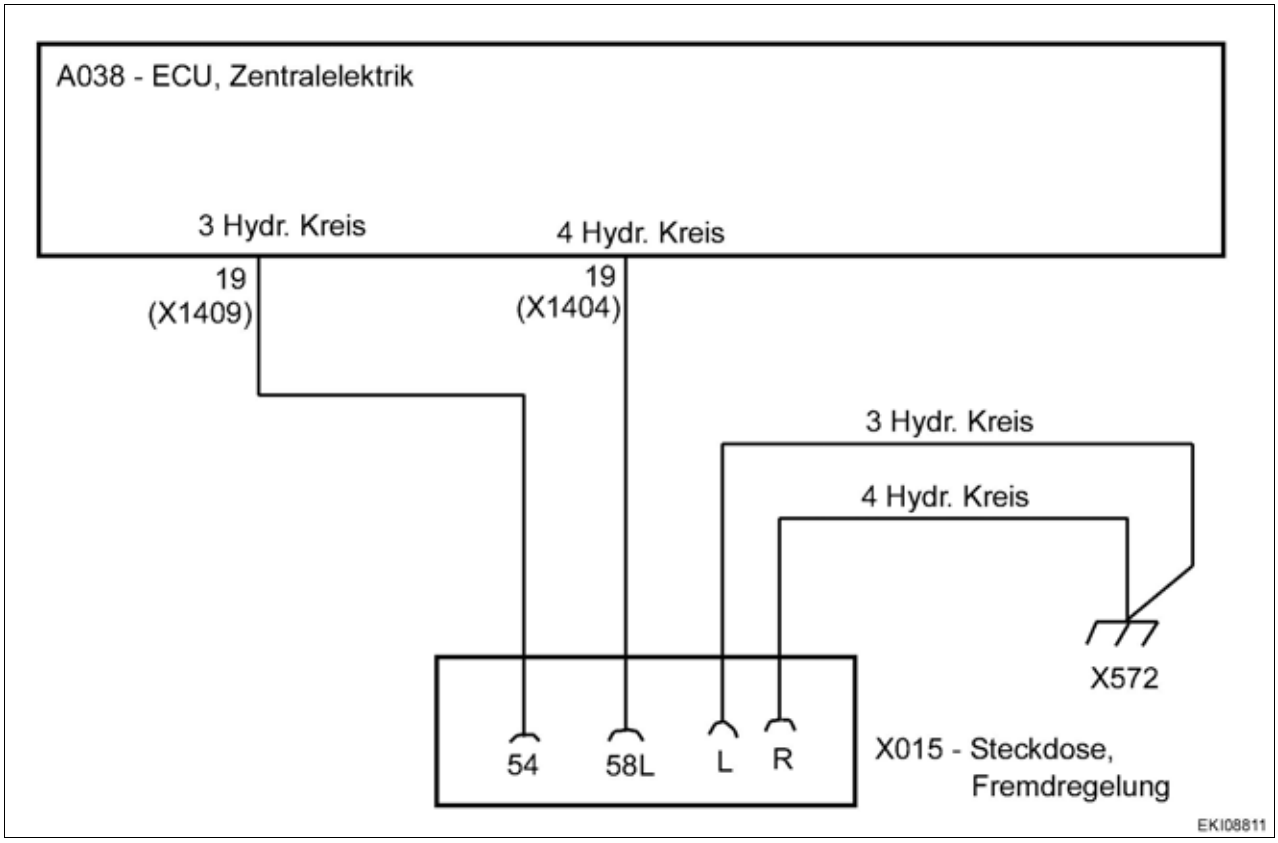


Fig. 459. I002840

Using multimeter (voltmeter), check voltage level at socket.

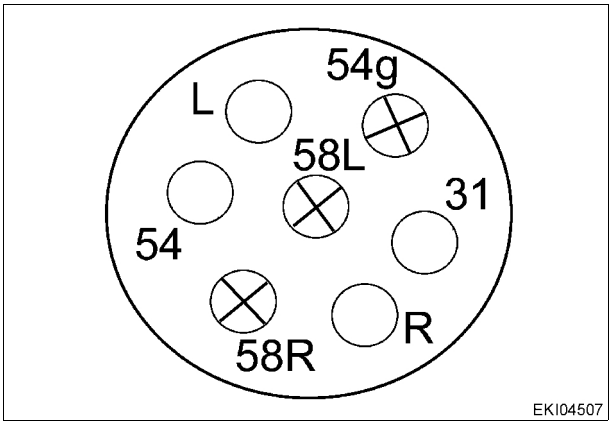


Fig. 460. I002779

3. Hydraulic circuit
Ignition ON.
Engine is running

Pin	Voltage level (U)
54	0 VDC (switch not actuated) 14 VDC (switch actuated)
L (earth)	

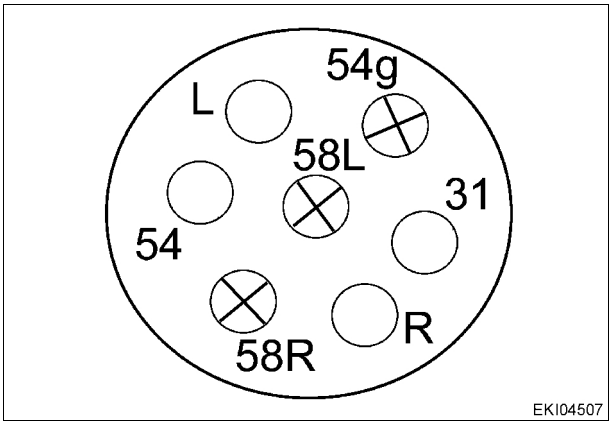


Fig. 461. I002779

4. Hydraulic circuit
Ignition ON.
Engine is running

Pin	Voltage level (U)
58L	0 VDC (switch not actuated) 14 VDC (switch actuated)
R (earth)	

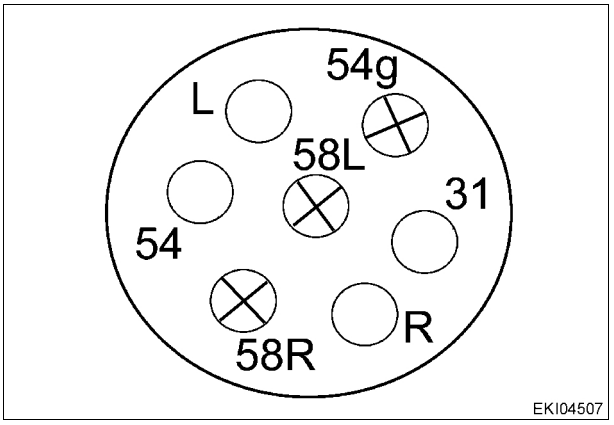


Fig. 462. I002779

NOTE: *see §13*
see §16

118 X015 external control socket (area: steering axle automatic mode)

X015 external control socket

NOTE: *The X015 socket has a white shield cover.*



Rear of tractor, right

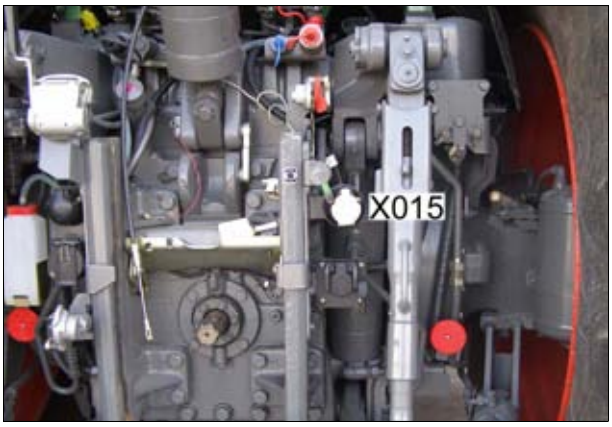


Fig. 463. I001300



Fig. 464. Electronic box for steering axle control (F 931.970.020.010) I004840

– The electronic box for steering axle control (F 931.970.020.010) is fitted on the trailer.
– The connector (X015) is inserted into the X015 external control socket on the tractor.
– The tractor's electronics detect the trailer and the steering axle can be adjusted on the Vario terminal

Check Chassis Range!

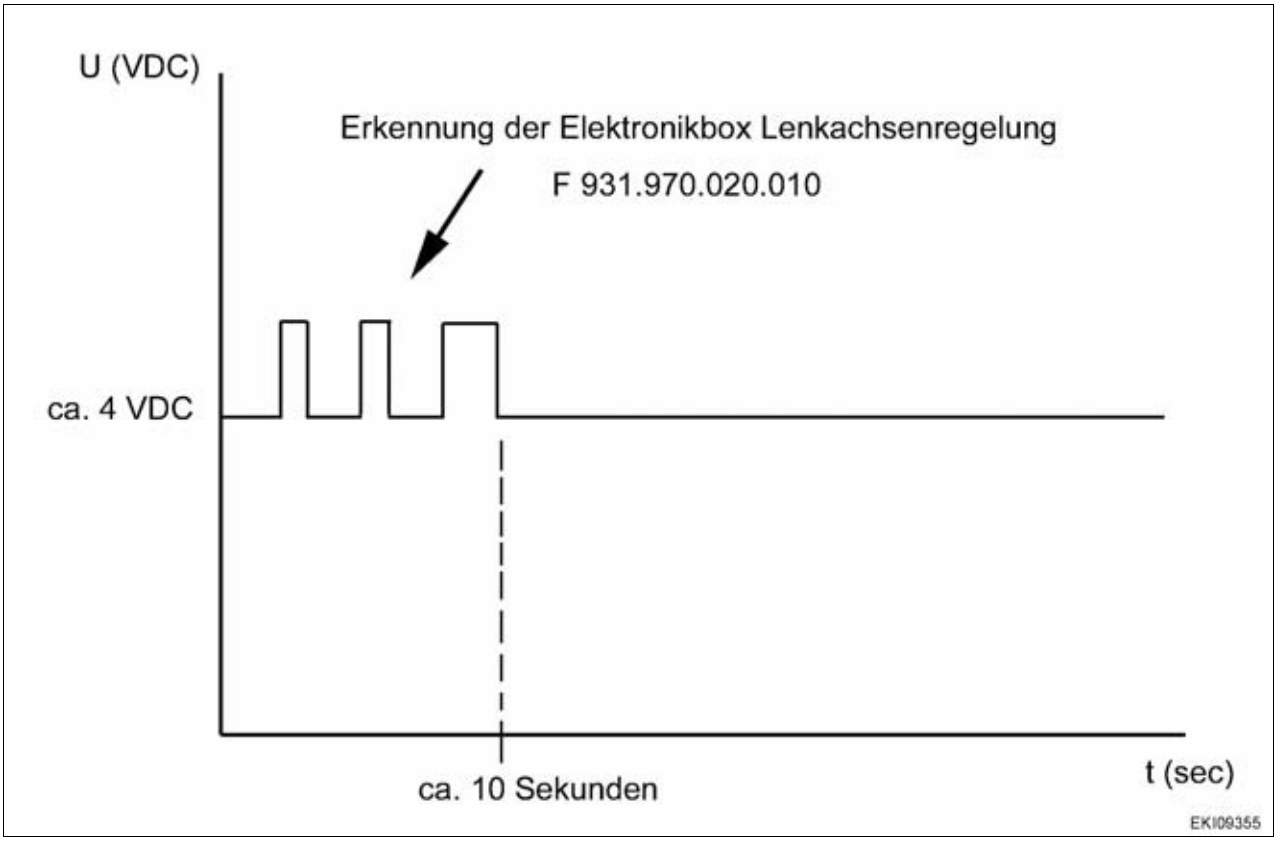


Fig. 465. Diagram: Detection (initialisation) of the electronic box for steering axle control (F 931.970.020.010) I005868

Connect the electronic box for steering axle control (F 931.970.020.010) to the X015 socket.
Switch ignition ON.
The electronic box (F 931.970.020.010) will start to send voltage pulses within approx. 10 seconds.
Using the voltage pulses, the A050 ECU basic control unit will detect the electronic box for the steering axle control (F 931.970.020.010).
The steering axle automatic mode can be set via the Vario terminal.

NOTE: *The individual voltage pulses are within ms range and can thus not be measured by a multimeter.*

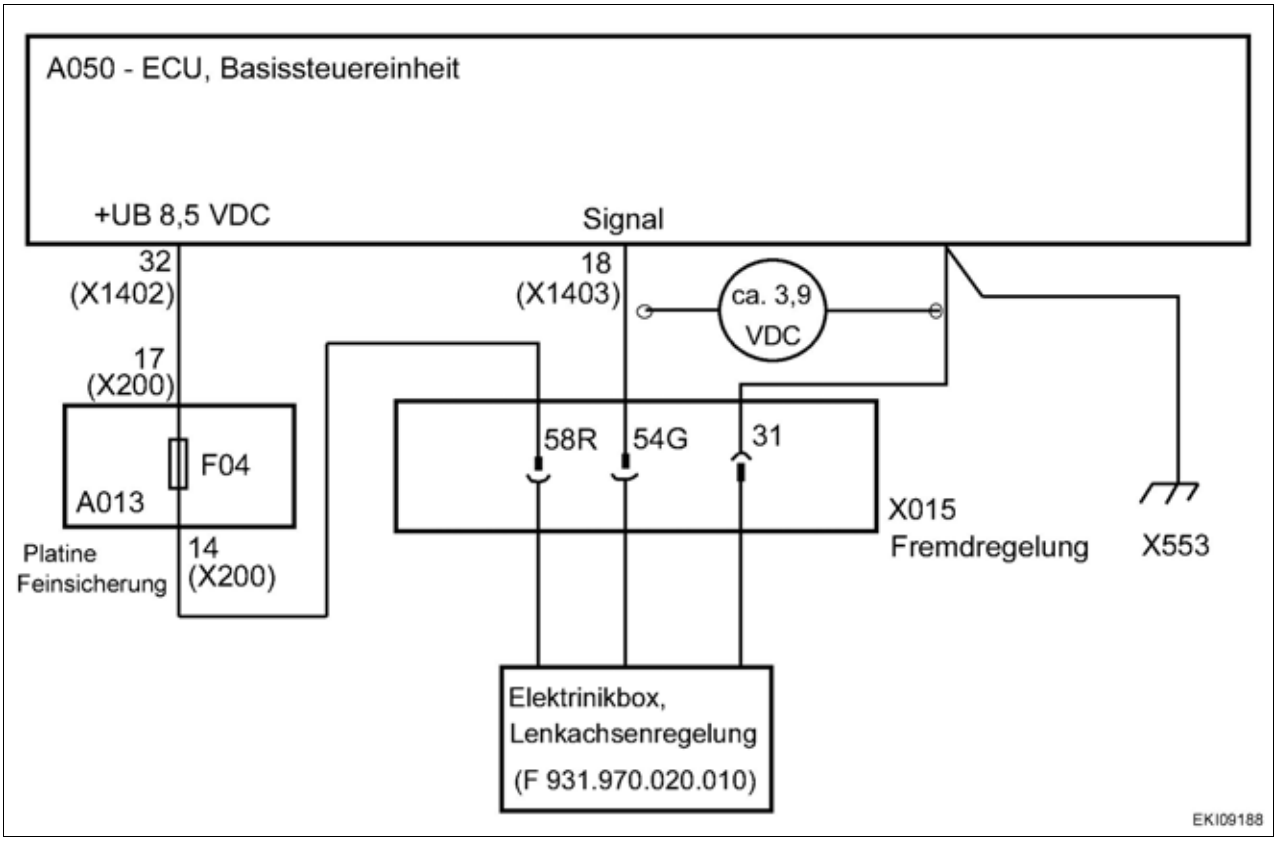


Fig. 466. Circuit diagram I004841

Item	Designation	Note
A013 PCB microfuse (microfuse no. 4)		
X200	Separation point on A013 PCB_microfuse	
Pin 17	+ supply for the A013 PCB micro-fuse (8.5 VDC)	Switch on ignition.
Pin 14	+supply for the external position sensor	Switch on ignition.
A050 ECU, basic control unit		
X1402	Separation point on the A050 ECU, basic control unit	
X1403	Separation point on the A050 ECU, basic control unit	
Pin 32 (to X1402)	+ supply for the A013 PCB micro-fuse (8.5 VDC)	Switch on ignition.
Pin 18 (on X1403)	Signal	
Electronic box for steering axle control (F 931.970.020.010)		
58R	+ supply (8.5 VDC)	Switch on ignition.
54G	Signal	
31	Earth	
X015 external control socket		
Pin 31	Earth	

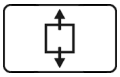
Item	Designation	Note
Pin 54G	Signal	
Pin 58R	+ supply (8.5 VDC)	Switch on ignition.
X553 earth pin		

Measuring points and signal values

A050 ECU, basic control unit
X1402 Separation point (58-pin)
X1403 Separation point (96-pin)



On right mudguard.



Remove panel.



Fig. 467. I001030

Measuring points on the A050 ECU, basic control unit (X1403 separation point)	
Pin	**Function**
18 (on X1403)	Signal
-	Vehicle earth



Fig. 468. I001668

Assignment on X899.980.304.000 adapter box
Connect the X899.980.304.000 adapter box and the X899.980.304.201 adapter cable to the A050 ECU, basic control unit and measure the pins (see table).

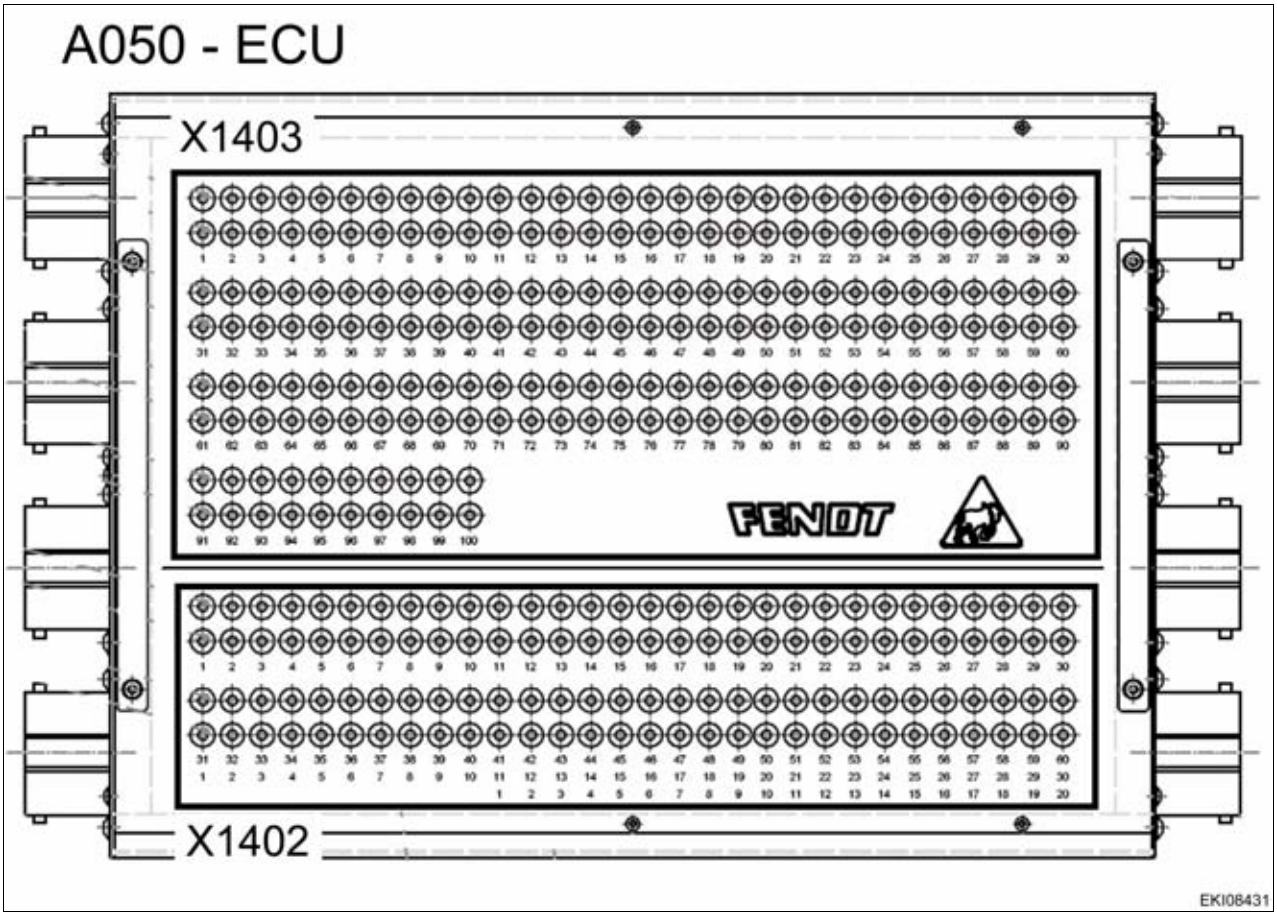


Fig. 469. I001874

X015 external control socket	
Pin	**Function**
58R	+ supply (8.5 VDC)
31	Earth
54G	Signal (Trailer detection)

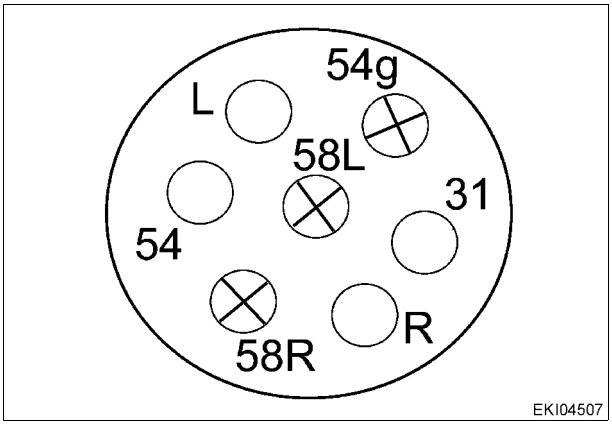


Fig. 470. I002779

Using multimeter (voltmeter),
check voltage level at socket

Check the +supply for the electronic box for steering axle control (F 931.970.020.010)
Ignition ON.

Pin	Voltage level (U)
58R	**8.5 VDC**
31 (earth)	

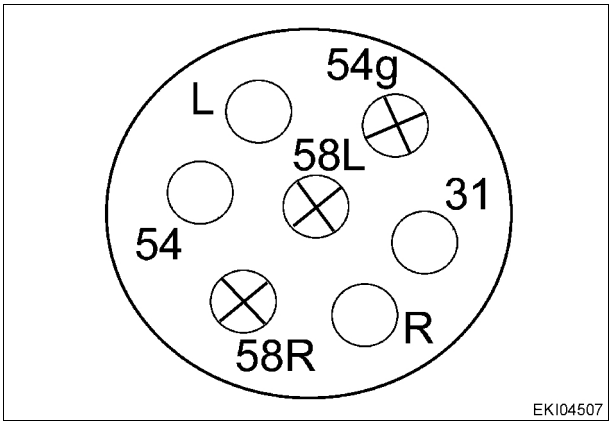


Fig. 471. I002779

Check the signal from the electronic box for steering axle control (F 931.970.020.010)
Ignition ON.

Pin	Voltage level (U)
54G	With connected electronic box (F 931.970.020.010) **approx. 3.9 VDC**
31 (earth)	

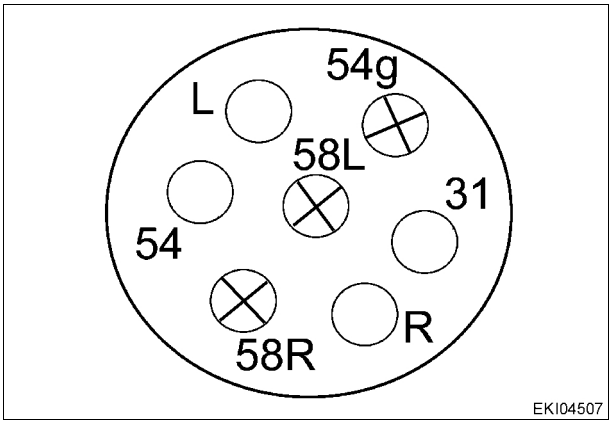


Fig. 472. I002779

Possible cause of fault

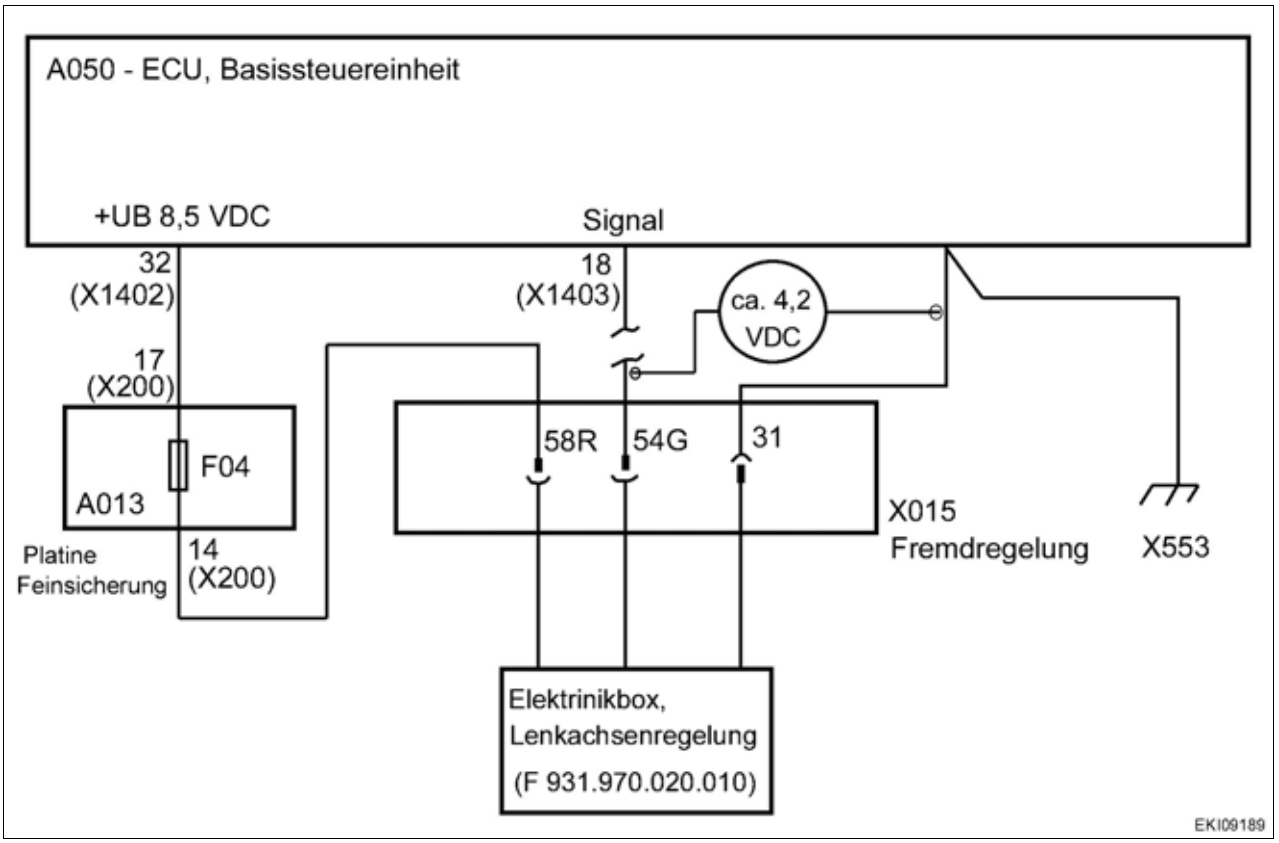


Fig. 473. I004842

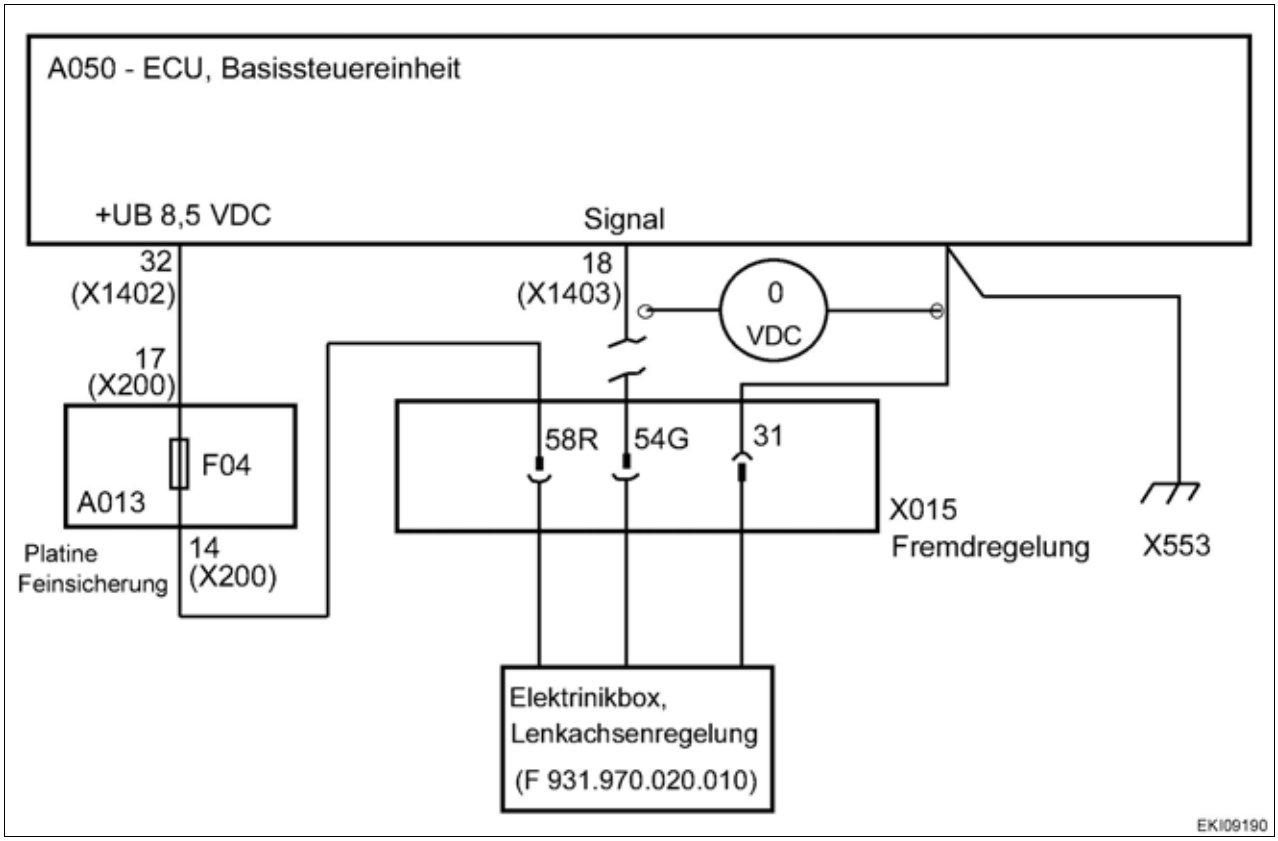


Fig. 474. I004843

Steering axle automatic mode function

WARNING: Steering axle automatic mode will influence driving behaviour when activated.

General notes:

- This function means that the **lower speed limit of 0 Km/h– 0,3 Km/h** and the upper speed limit of **10 Km/h– 25 Km/h** can be adjusted.
- The **steering axle automatic mode** can **only be activated if the tractor is stationary**.
- **By actuating the buttons on the joystick, linear module or crossgate lever, the valve status can be adjusted even while the steering axle automatic mode is activated**, for example: if the steering axle is open and needs to be locked, simply pressing **"Raise (+)"** will initialise **"locking"**. The **"steering axle reopened"** action is easily triggered by pressing **"Floating position"**.
- It is not possible to **activate the steering axle automatic mode** if the **auxiliary control valves are locked**. If the auxiliary control valves are locked, the activation is reset.
- **Any active time function on the auxiliary control valve is deactivated in the event of steering axle automatic mode ON**, and it cannot be reactivated
- **Only when the steering axle automatic mode is disabled is it possible to change the selection of auxiliary control valve.**
- **The selected auxiliary control valve cannot be selected for external valve actuation; if the selected auxiliary control valve is assigned the function "external valve actuation", the steering axle automatic mode cannot be selected and is hidden**.

Press F6.

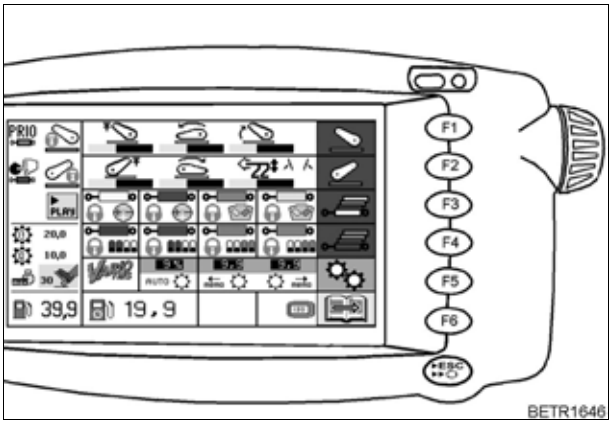


Fig. 475. I004853

The sub-menu is displayed.
Press the (F5) key.

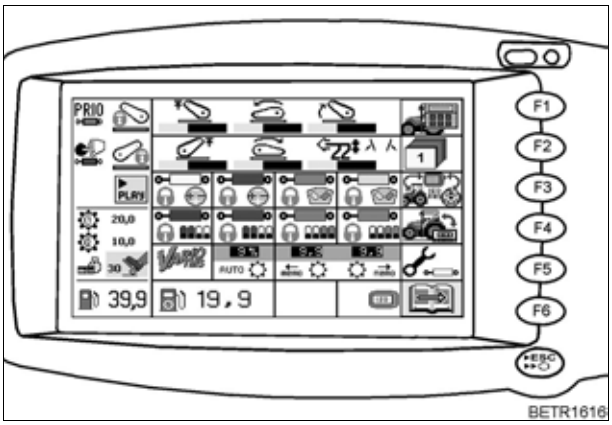


Fig. 476. I004854

Select the required hydraulic valve using the (F3) key.

Select the steering axle automatic mode with the (F4) key; the following menu appears.

NOTE: *If the electronic box for steering axle control (part no. F931.970.020.010) is not connected, there is no display at position (A).*
If the hydraulic valve is unlocked but not assigned to the steering axle automatic mode, there is no display at position (B).

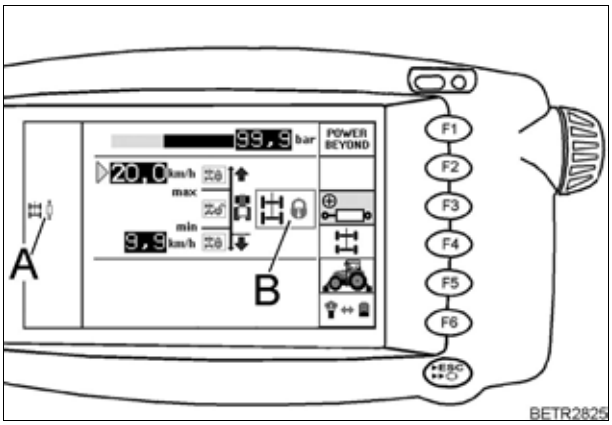


Fig. 477. I004855

Key (F3):
Confirm whether the required hydraulic valve is connected.

Key (F4):
The hydraulic valve is not activated for the steering axle automatic mode.

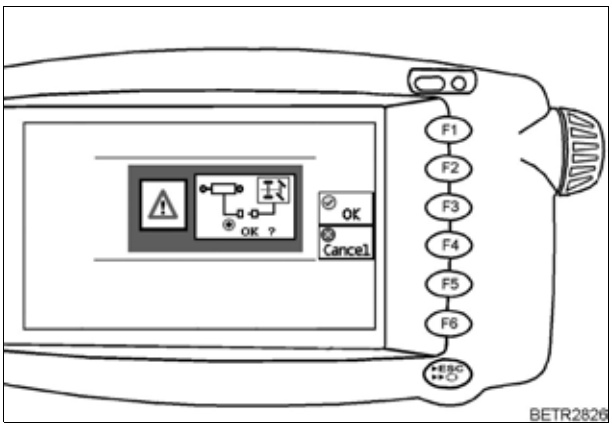


Fig. 478. I004856

Setting the speed limit

- Turn setting knob (A).
- Indicator (B) changes from top to bottom.
- Press setting knob (A).
- Indicator (B) changes from green to red.
- Turn setting knob (A), settings are changed.
- Press setting knob (A), settings are stored.
- Indicator (B) changes from red to green and jumps to the next setting option.

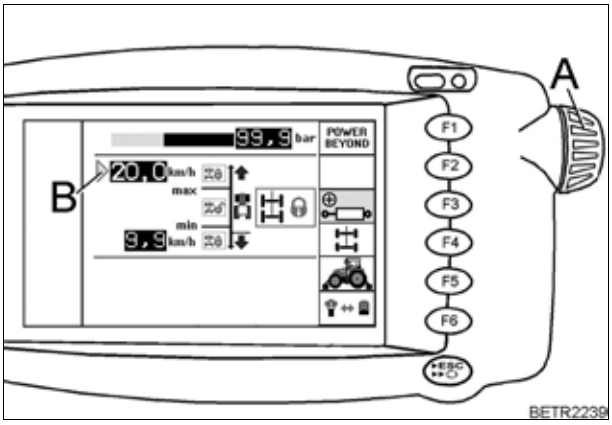


Fig. 479. I004859

Speed	Steering axle (on trailer)
Lower speed limit 0 Km/h to 3 Km/h	**The steering axle is open within these speed limits.**
Upper speed limit 10 Km/h to 25 Km/h	**Below the lower speed limit:** The steering axle is locked. Manual operation with the buttons on the joy stick, linear module or crossgate lever is possible **Above the upper speed limit:** The steering axle is locked. Manual operation is not possible
Note: When the tractor starts, the steering axle is initially locked (ensure a defined steering axle status). From a speed of at least 0,5 Km/h, the steering axle is then opened if necessary.	

Hydraulic oil pressure at the breakaway coupling	Steering axle status (at the trailer)
0 bar (Floating position)	Steering axle open
200 bar ("Raise +" connection)	Steering axle locked

Possible displays

Possible displays (A, B) for the steering axle automatic mode on the main page

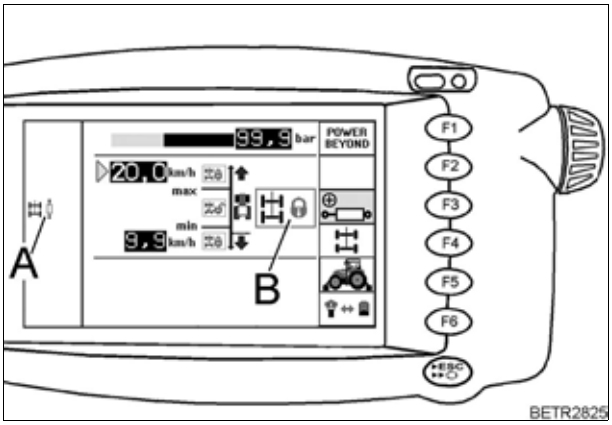
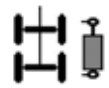
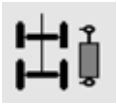


Fig. 480. I004855

Possible displays (A)



Steering axle automatic mode not activated (white background)



Steering axle automatic mode activated and locked (green background)



Steering axle automatic mode active and unlocked



Error message (e.g. auxiliary control valve, electrical defect)

Possible displays (B)



Steering axle automatic mode unlocked



Steering axle automatic mode locked (depending on the speed range)

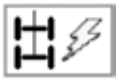


No activation possible (tractor moving)



Selected hydraulic valve is locked

No display. Hydraulic valve unlocked, the steering axle automatic mode is not assigned to the required hydraulic valve.



Error message (e.g.auxiliary control valve, electrical defect)

Display in the A007 instrument panel's multiple display (appears for approx. 5 seconds)

Multiple display on the A007 instrument panel



Fig. 481. I001023



Steering axle automatic mode activated



Steering axle automatic mode not activated

Check Chassis Range!

119 X017 front socket (with front power lift only)

Using multimeter (voltmeter),
check voltage level at socket

Fit outputs with a 55 W bulb
Voltage drop max. 1 VDC from last reading

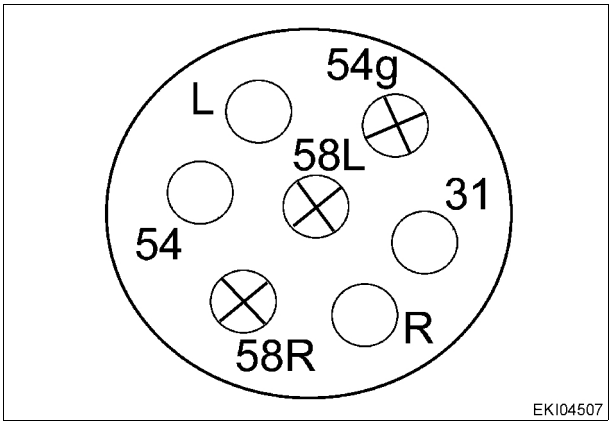


Fig. 482. I002779

X017 front socket			
Target values measured for pin 31 (earth)			
Pin	**Designation**	**Function**	**Specified value**
L	Left direction indicator	Direction indicator OFF	0 VDC
		Indicating left	12 VDC (intermittent)
R	Right direction indicator	Direction indicator OFF	0 VDC
		Indicating right	12 VDC (intermittent)
31	Earth	-	-
54	Not assigned	-	-
54G	Not assigned	-	-
58L	Left-hand marker light	Marker light OFF	approx. 4.4 VDC (not loadable)
		Marker light ON	12 VDC
58R	Right-hand marker light	Marker light OFF	approx. 4.4 VDC (not loadable)
		Marker light ON	12 VDC

NOTE: *see §13*
see §16

120 X018 trailer socket

Using multimeter (voltmeter),
check voltage level at socket

Fit outputs with a 55 W bulb
Voltage drop max. 1 VDC from last reading

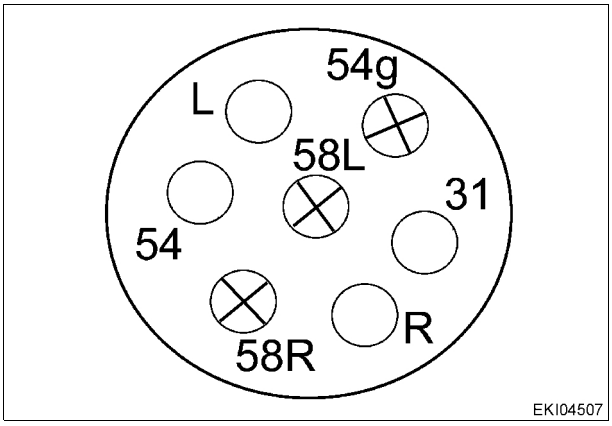


Fig. 483. I002779

X017 front socket			
Target values measured for pin 31 (earth)			
Pin	**Designation**	**Function**	**Specified value**
L	Left direction indicator	Direction indicator OFF	0 VDC
		Indicating left	12 VDC (intermittent)
R	Right direction indicator	Direction indicator OFF	0 VDC
		Indicating right	12 VDC (intermittent)
31	Earth	-	-
54	Brake light	Brake light OFF	12 VDC (not loadable)
		Brake light ON	12 VDC
54G	Not assigned	-	-
58L	Left tail light	Tail light OFF	approx. 4.4 VDC (not loadable)
		Tail light ON	12 VDC
58R	Right tail light	Tail light OFF	approx. 4.4 VDC (not loadable)
		Tail light ON	12 VDC

NOTE: *see §13*
see §16

121 X028 ISO BUS implement socket (in cab)

Circuit diagram: X028 ISO BUS implement socket (in cab)

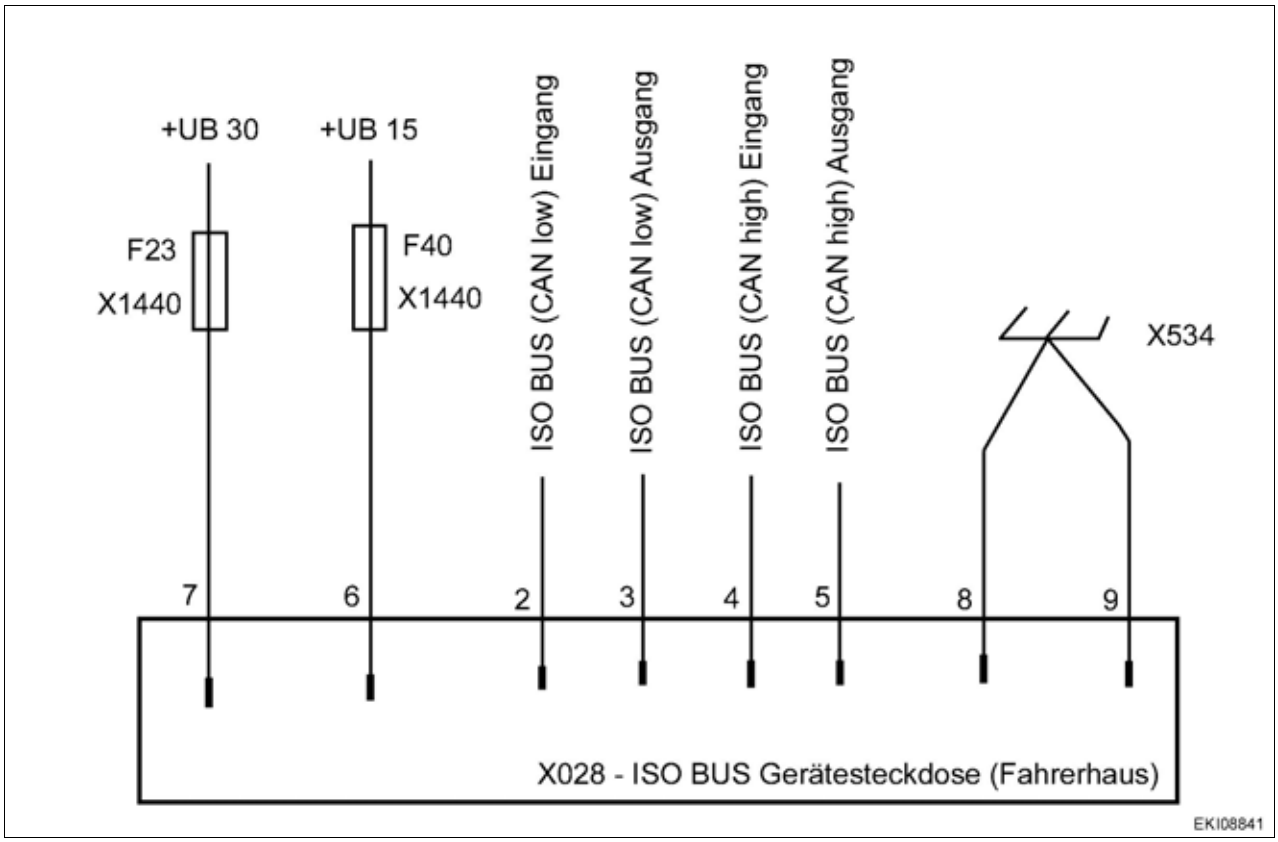


Fig. 484. I002978

Circuit diagram: ISO BUS

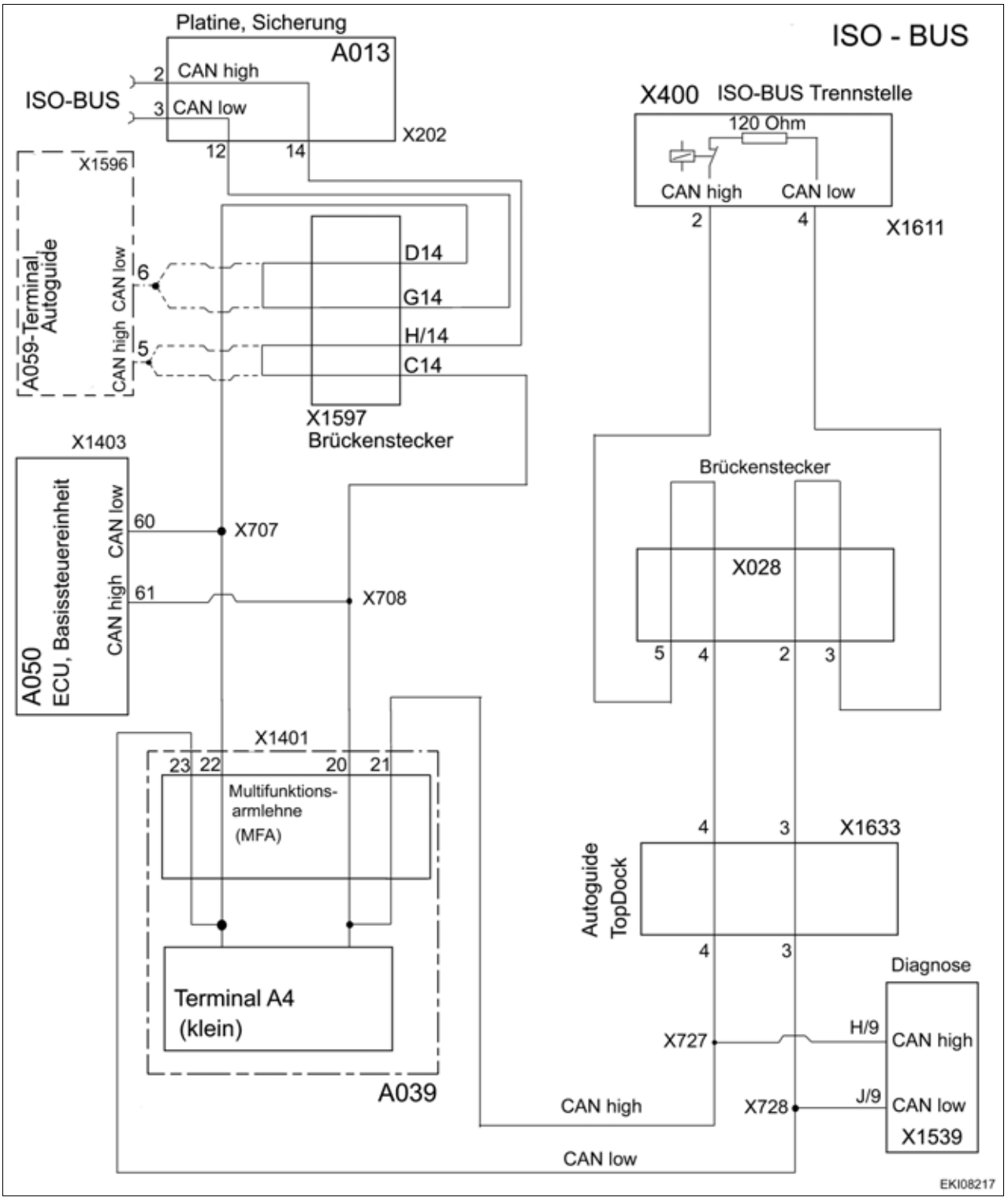


Fig. 485. I001189

NOTE: *see §20*

Measuring points and signal values

A = Socket in cab
B = Connector for ISO BUS terminal

Pin	Function
1	Not assigned
2	ISO BUS (CAN low) input
3	ISO BUS (CAN low) output
4	ISO BUS (CAN high) input
5	ISO BUS (CAN high) output
6	+ UB 15 (ignition ON = 12 VDC)
7	+ UB 30 (12 VDC)
8	Earth
9	Earth

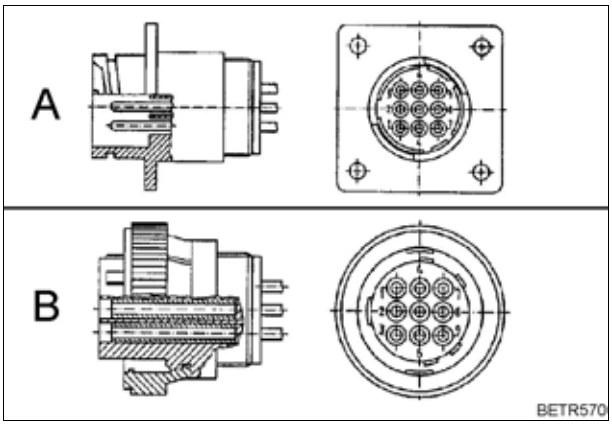


Fig. 486. I002979

122 X400 ISO BUS PCB (implement socket)

Circuit diagram: X400 ISO BUS PCB (implement socket)

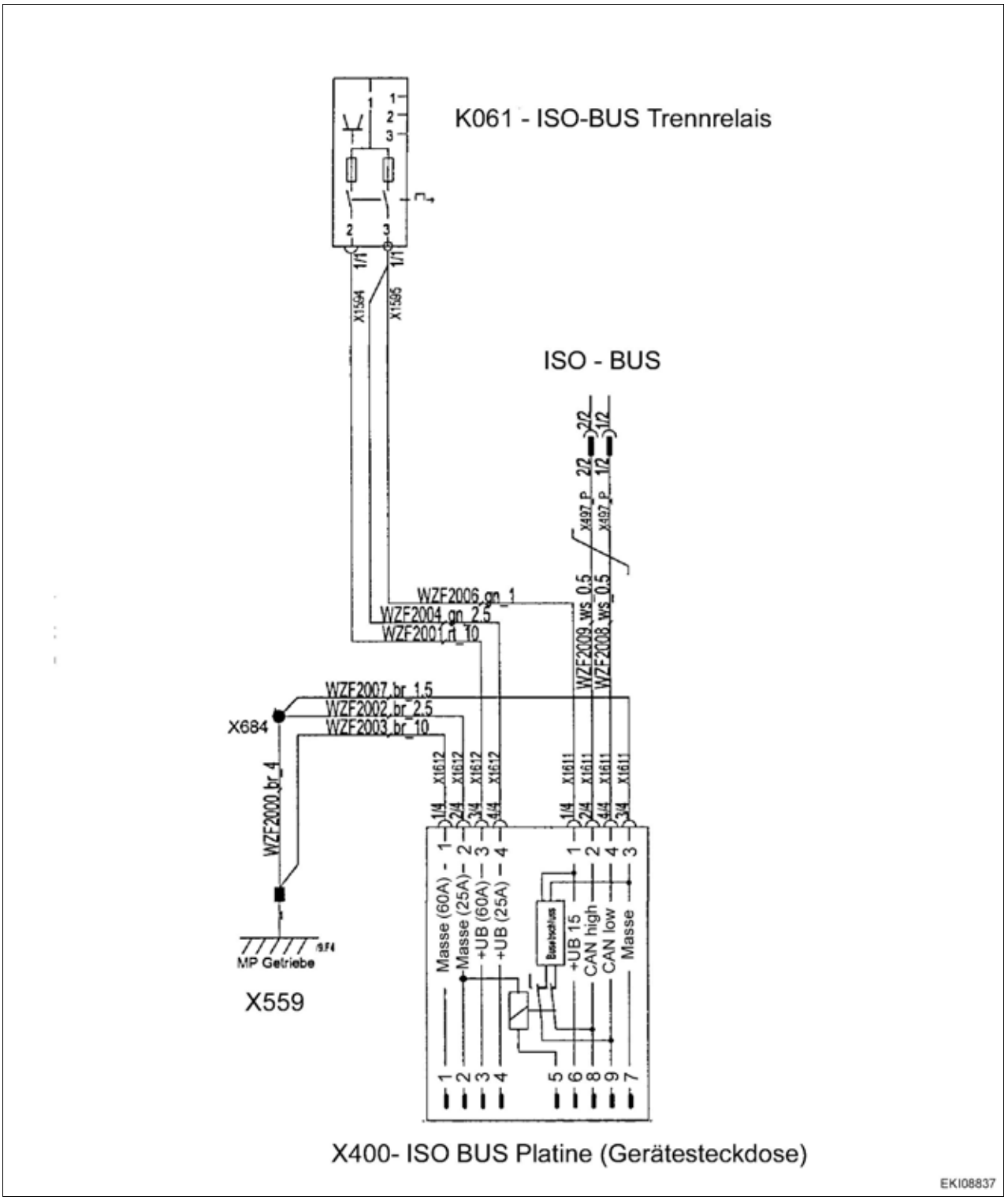


Fig. 487. I002972

NOTE: *Only ISO BUS-compatible implements can be operated via the X400 implement socket. LBS BUS-compatible implements are not supported!*

NOTE: *If no K061 ISON bus disconnect relay is installed, the voltage supplies are (pin 3, 4, 6 on the X400 implement socket) protected against short circuits with fuses (see image).*

Fuse	Order number
25 amp fuse	931.970.170.910
60 amp fuse	H 931.970.170.920



Fig. 488. I001609

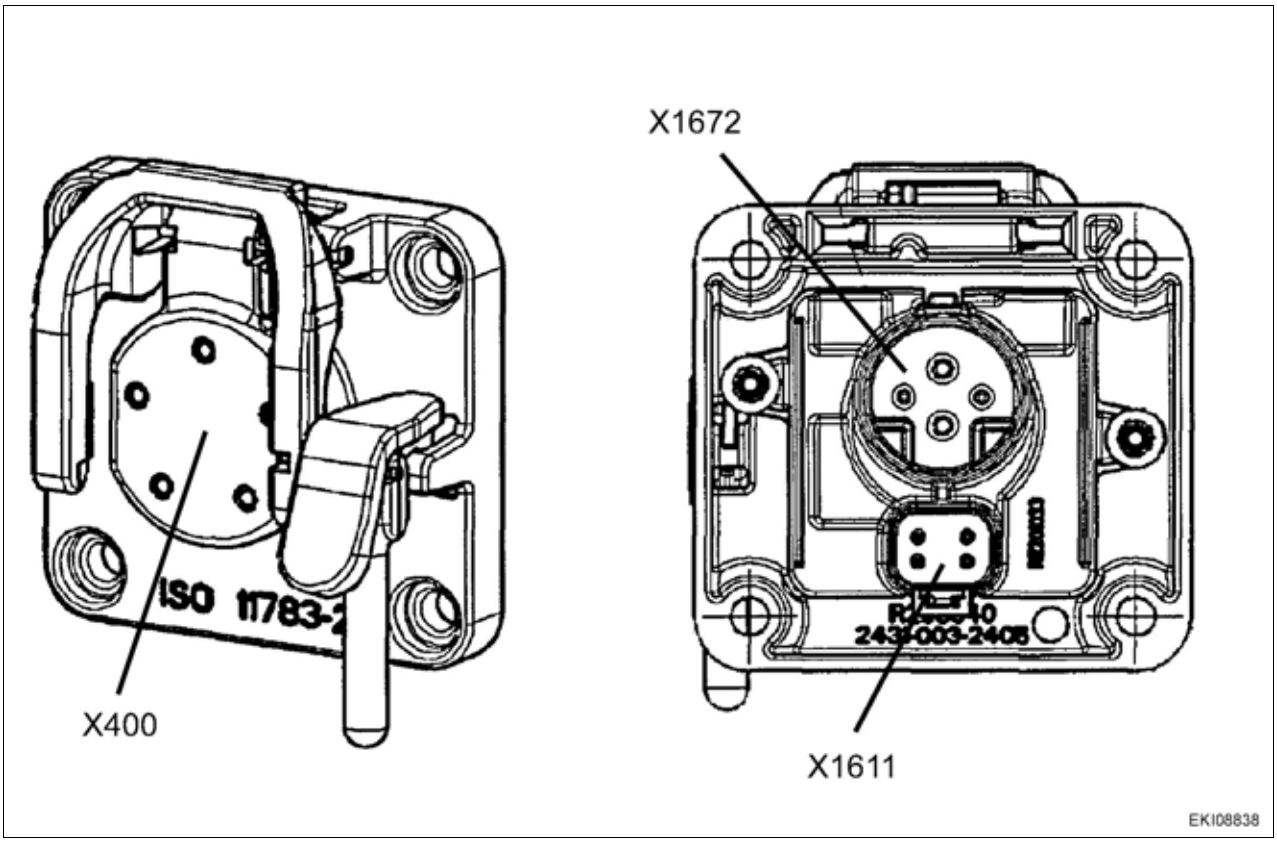


Fig. 489. I002973

Pin	Function
1	**Earth** (60 A)
2	**Earth** (25 A)
3	60 amp power supply, **+UB (12 VDC)**
4	25 amp supply to implement electronics, **+UB (12 VDC)**
5	**Control signal for switching the end network**, bridged with pin 4 in the connector
6	**+UB (12 VDC)**
7	**Electronics earth**
8	**ISO BUS (CAN high)**
9	**ISO BUS (CAN low)**

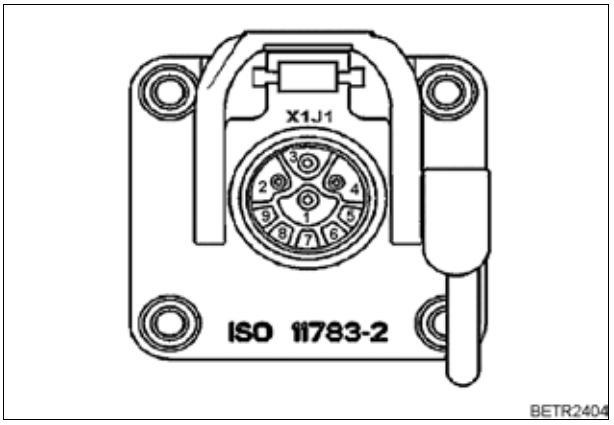


Fig. 490. I002970

Test the X400 implement socket with a 55 W bulb
Ignition OFF (K061 ISO BUS disconnect relay open) = Bulb OFF
Ignition ON (K061 ISO BUS disconnect relay closed) = Bulb ON

Pin 1 = Earth (60 A)
Pin 3 = +UB 30
Pin 4 = +UB 30



Fig. 491. I002974

Circuit diagram: ISO bus

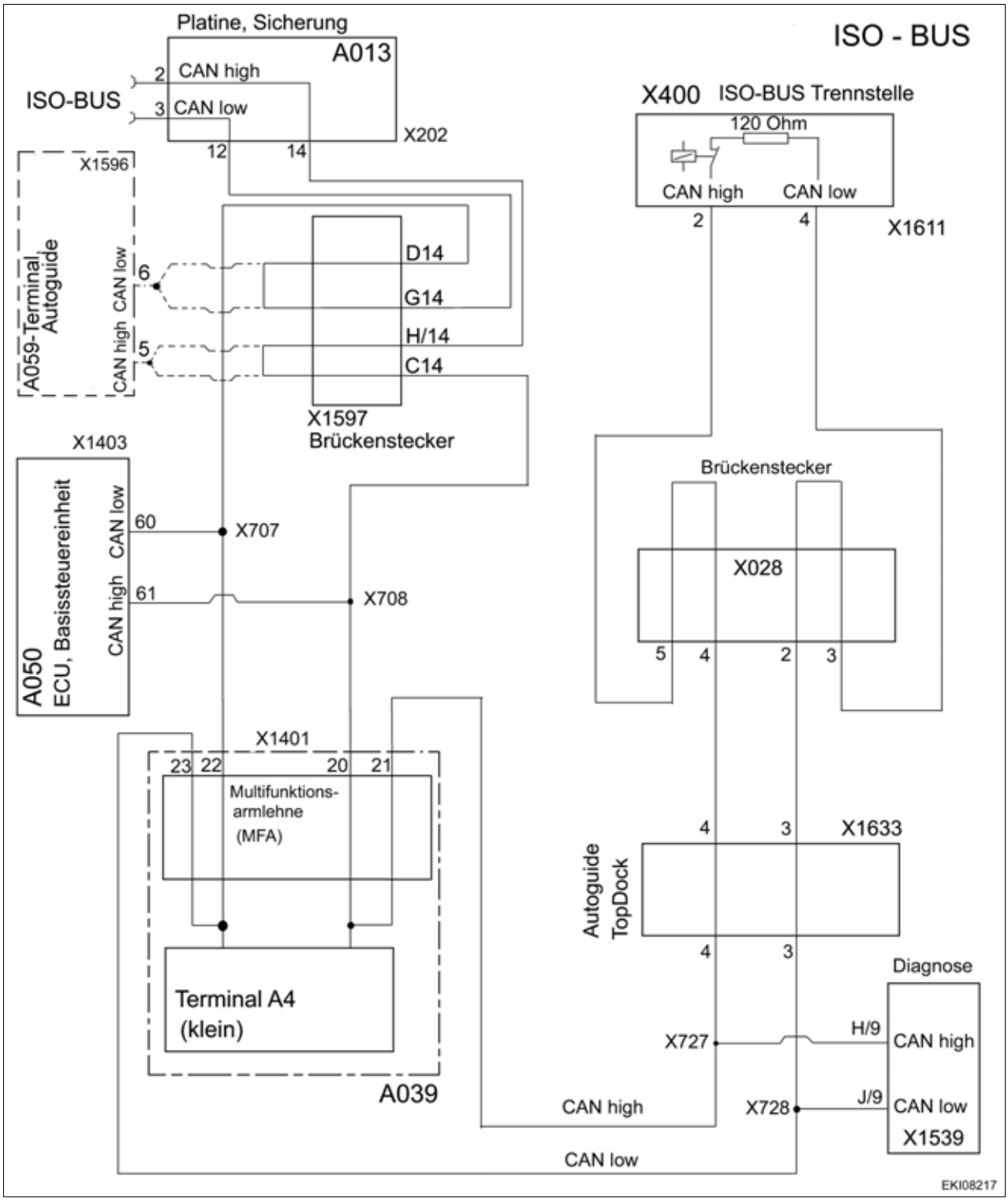


Fig. 492. I001189

NOTE: *see §20*

123 X1048 ABS socket (anti-lock system on trailer)

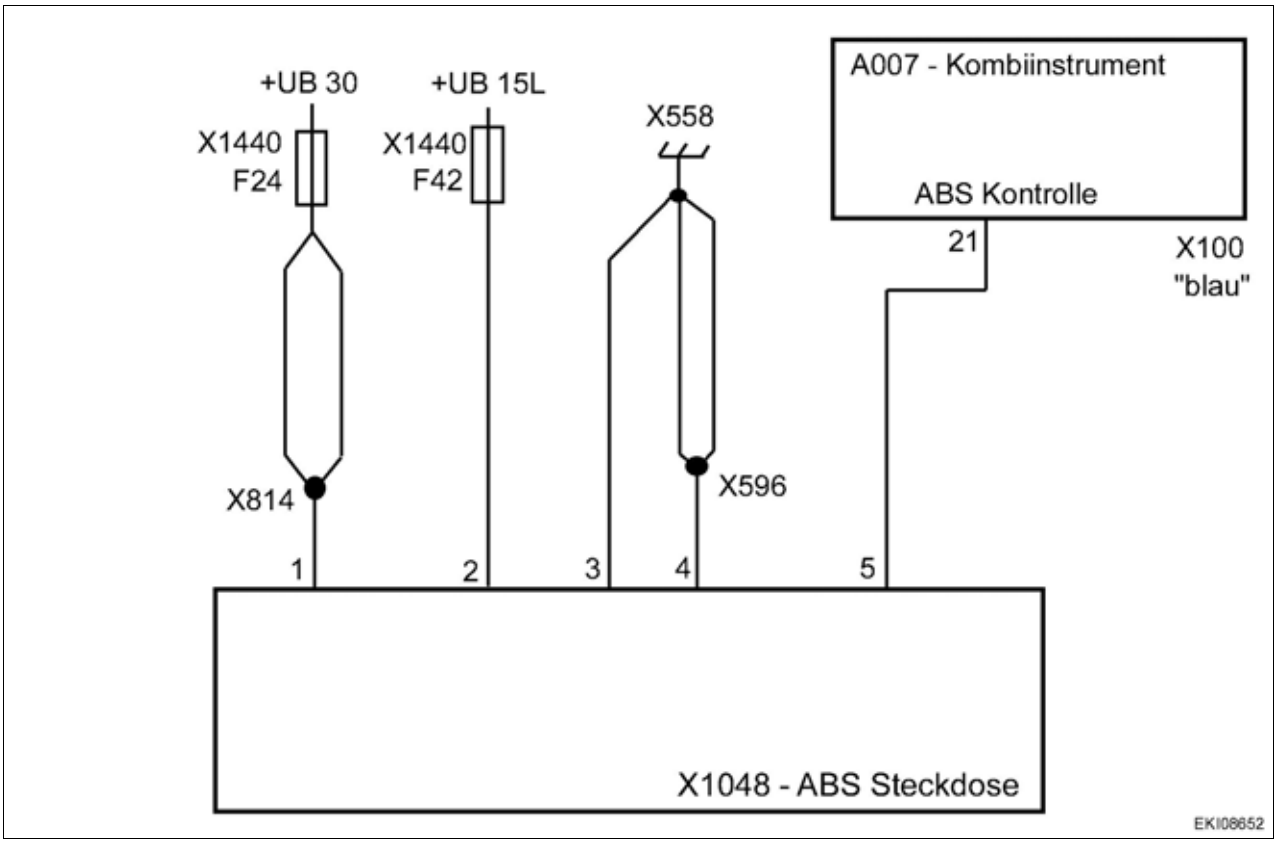


Fig. 493. I002519

Item	Designation	Note
X1048 - Socket ABS		
1	+ UB 30	F24 fuse (X1440 fuse holder)
2	+ UB 15	F42 fuse (X1440 fuse holder)
3	Earth	
4	Earth	
5	Indicator lamp, ABS socket	
A007 - Instrument panel		
X100	Separation point, "blue"	
21	ABS indicator lamp	
X558	Earth pin	
X596	Connector, earth	
X814	Connector, + UB 30	

Measuring points and signal values

X1048 - Socket ABS	
Pin	**Function**
1	+ UB 30
2	+ UB 15
3	Earth
4	Earth
5	+UB 15 (indicator lamp)

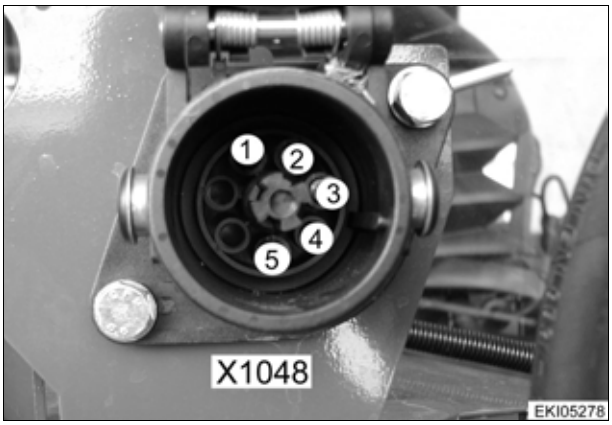


Fig. 494. I002520

Function of **X1048** - Socket ABS
The tractor itself has no ABS control.
The **X1048** - Socket ABS provides the option of operating a trailer with ABS equipment.
The tractor is fitted with an **X1048** - Socket ABS for a 12 VDC ABS system.
The **X1048** - Socket ABS supplies the ABS control unit on the trailer with +12 VDC supply and earth.
An indicator light (A007 instrument panel) on the tractor is also controlled to provide ABS system diagnostics.
In the event of a fault in the ABS system, the ABS control unit (trailer) switches the earth to the X1048 - Socket ABS and the ABS indicator light illuminates on the A007 instrument panel.
This indicator light also lights up briefly when switching the ignition on/off or when connecting the ABS trailer.

The ABS system (antilock system on trailer)
The ABS system is an extension to the standard brake system.
The ABS system comprises the following:
- ABS control unit (on trailer)
- Speed sensors on the wheels
- Two or three electro-pneumatic modulators to increase, retain or lower brake pressure
During a braking operation, the speed sensors supply continuous speed signals to the ABS control unit.
If a wheel starts to lock, the ABS control unit sends a signal to the modulator. The brake pressure at the wheel is reduced, preventing the wheel from locking.

NOTE: *Even if there is no ABS control, or if there is a fault in the system, the normal braking function remains available.*

124 Y002/Y003 solenoid valve, travel range I/II

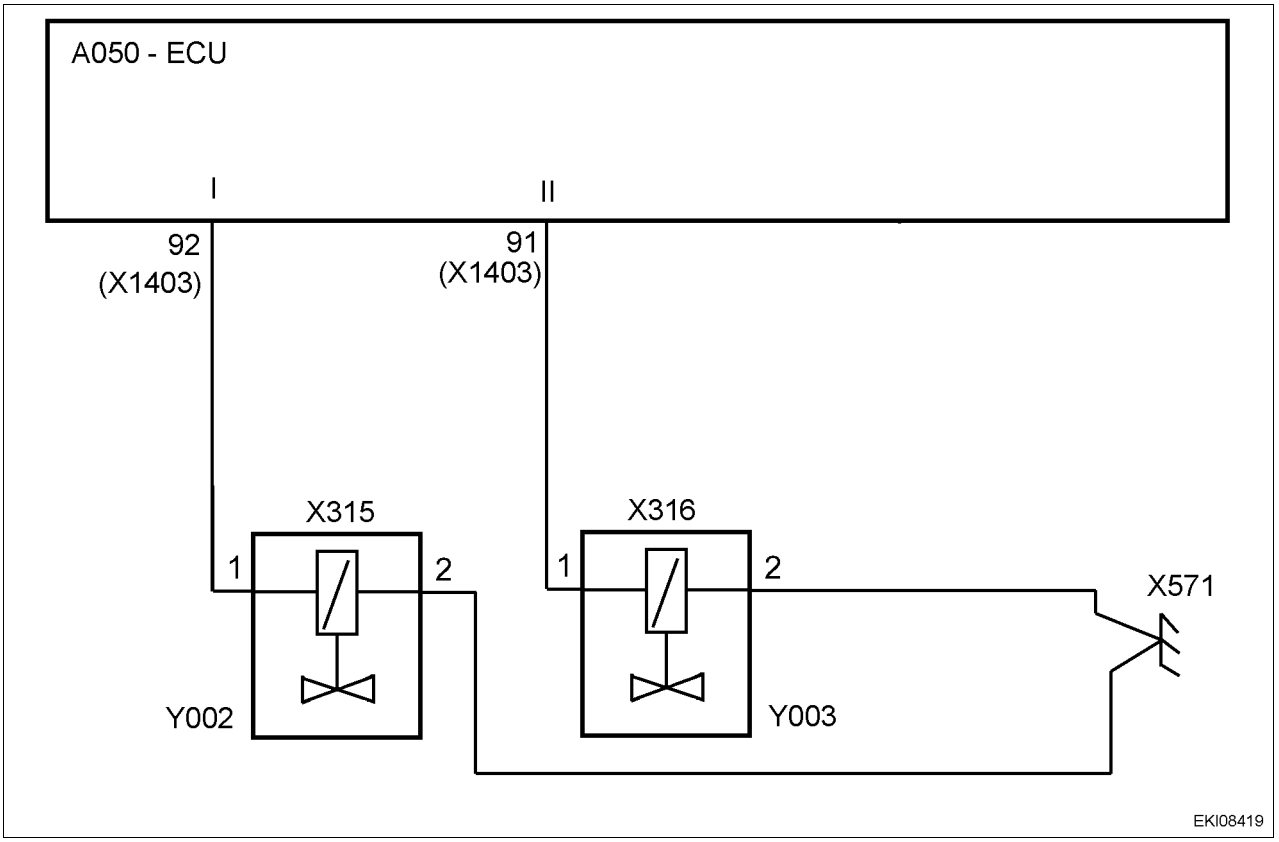


Fig. 495. I001994

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 91 (on X1403)	Activation of **Y003** - Solenoid valve, travel range II	
Pin 92 (on X1403)	Activation of **Y002** - Solenoid valve, travel range I	
Y002 - Solenoid valve, travel range I		
X315	Separation point on Y002	
Y003 - Solenoid valve, travel range II		
X316	Separation point on Y003	
Pin 1	Signal	
Pin 2	Earth	
X571 earth pin		

Measuring points and signal values

Y002/Y003 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth

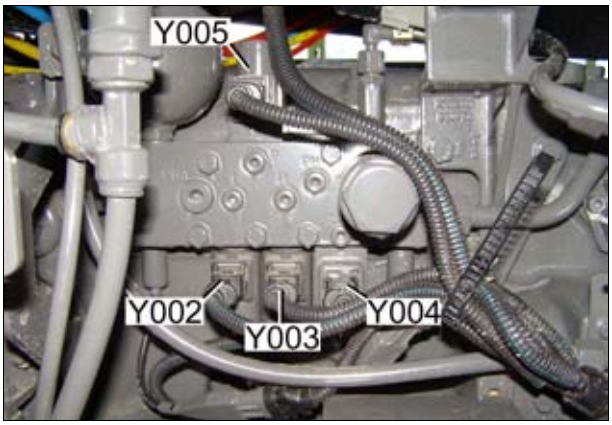


Fig. 496. I001161

Measuring resistance (ohms)

NOTE: *Connect adapter cable X899.980.246.201 directly to the component (plug adapter cable into the component only).*
Switch off ignition.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 8.3 ohms		
Earth	2			

Measuring signal voltage

NOTE: *Connect the X899.980.246.201 adapter cable directly to the component*
Switch on ignition.
All readings +/- 10%.

Y002 - Solenoid valve, travel range I				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
Actuation	1	12 VDC (during the switching operation only)	Switch travel range I (field)	
Earth	2			

Y003 - Solenoid valve, travel range II				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
Actuation	1	12 VDC (during the switching operation only)	Switch travel range II (field)	
Earth	2			

Measuring the power consumption

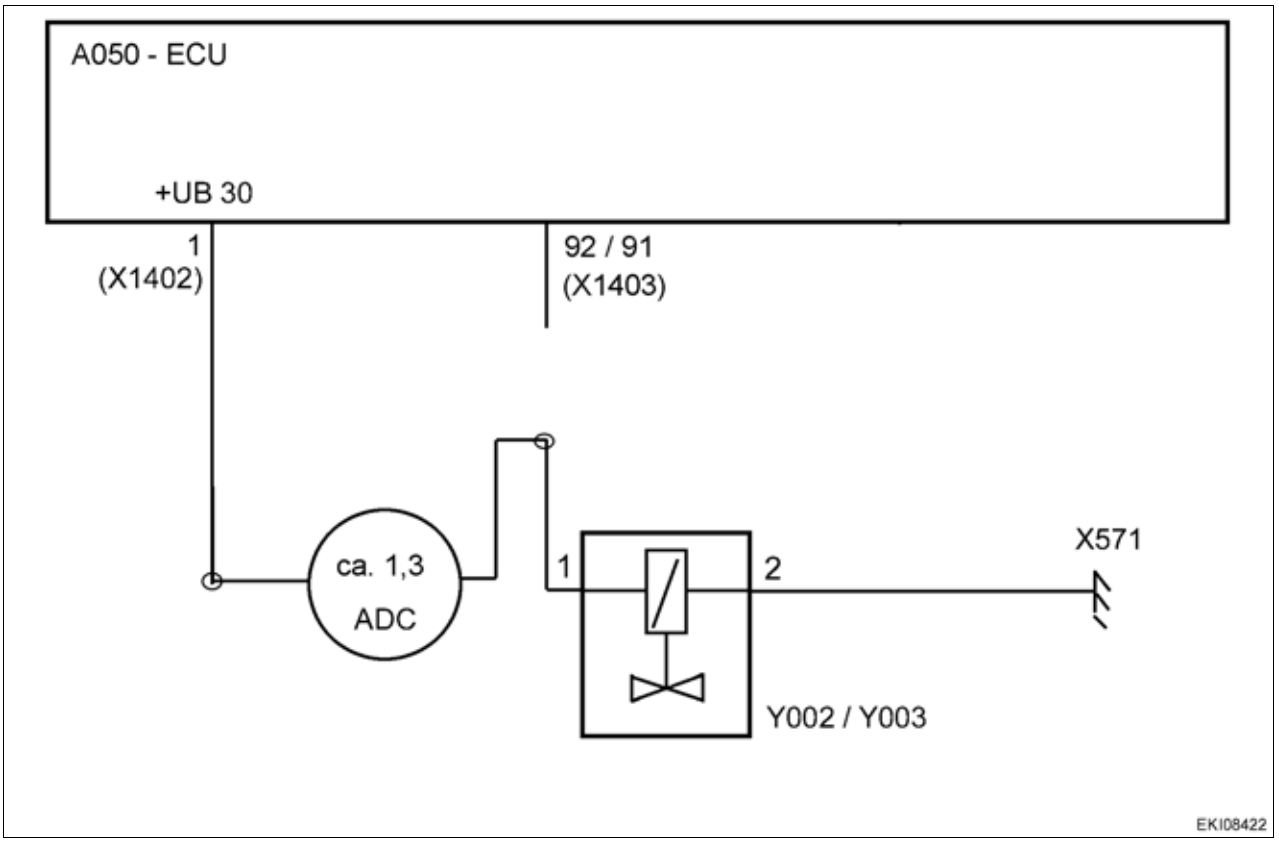


Fig. 497. I001995

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open pin 1 (X1402) (+UB 30)

to measure Y002 - Solenoid valve, travel range I
Open pin 92 (X1403)

to measure Y003 - Solenoid valve, travel range II
Open pin 91 (X1403).

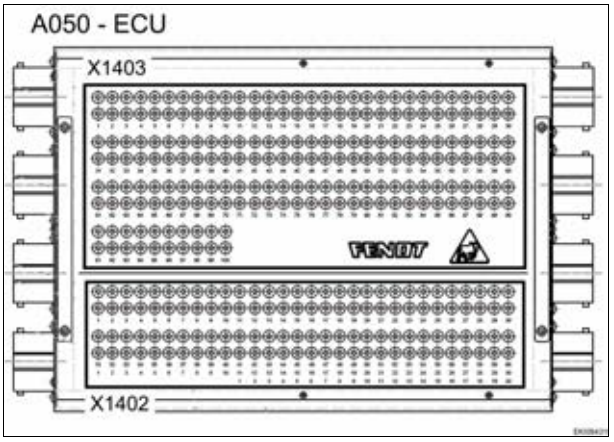


Fig. 498. I001874

Y002 - Solenoid valve, travel range I				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
Actuation	**Pin 1 (X1402)** and **Pin 92 (X1403)**	Approx. 1.3 ADC		When switching travel ranges, the solenoid valve for switching ranges is only energised briefly. Therefore, this test method is required.
Note: On pin 1 (X1402) "green socket" and on pin 92 (1403) "yellow socket"				

Y003 - Solenoid valve, travel range II				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
Actuation	**Pin 1 (X1402)** and **Pin 91 (X1403)**	Approx. 1.3 ADC		When switching travel ranges, the solenoid valve for switching ranges is only energised briefly. Therefore, this test method is required.
Note: On pin 1 (X1402) "green socket" and on pin 91 (1403) "yellow socket"				

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Actuation of Y003 solenoid valve, travel range II	91
Actuation at Y002 solenoid valve, travel range I	92

NOTE: *see §31*
see §34

125 Y004 turbo clutch solenoid valve

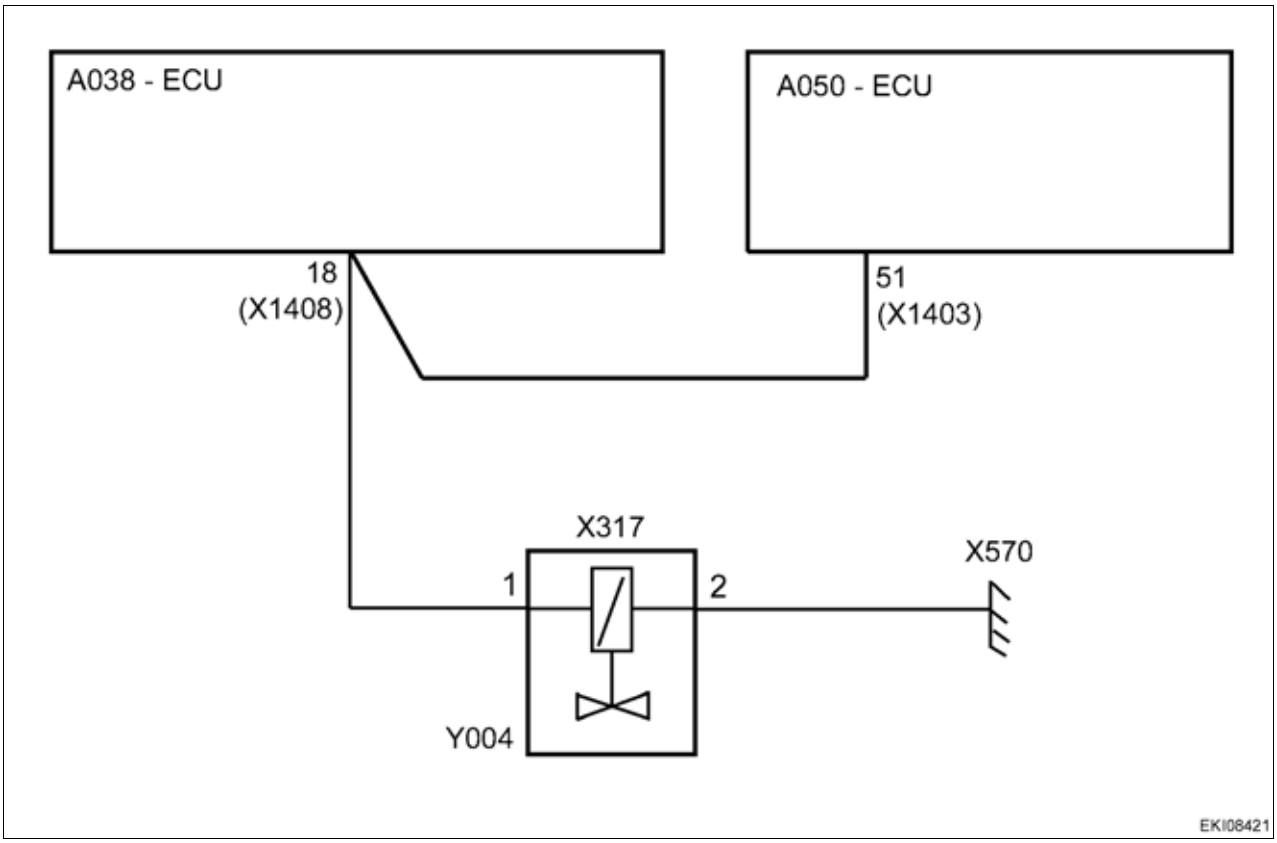


Fig. 499. I001996

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 51 (on X1403)	Actuation of Y004	
A038 - ECU, central electrical system		
X1408	Separation point on A038	
Pin 18	Actuation of Y004	Is energised for transmission emergency mode. **Note:** *see §31*
Y004 - Solenoid valve, turbo-clutch		
X317	Separation point on Y004	
Pin 1	Signal	
Pin 2	Earth	
X570 earth pin		

Measuring points and signal values

Y004 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth

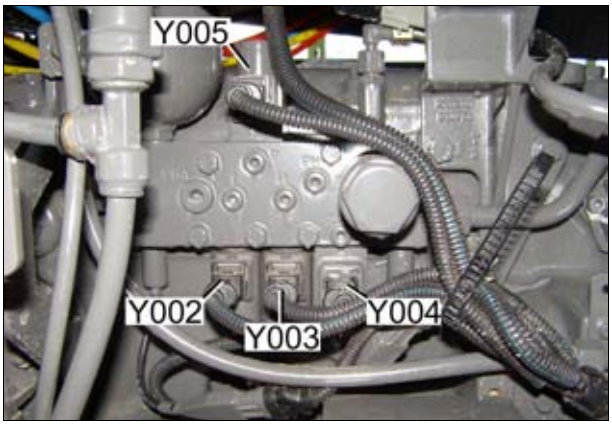


Fig. 500. I001161

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Connect adapter cable X899.980.246.201 directly to the component (plug adapter cable into the component only).
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 6.4 ohms	Approx. 20 °C (coil temperature)	
		Approx. 9.7 ohms	Approx. 150 °C (coil temperature)	
Earth	2			

Measuring the power consumption

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open **pin 51** (X1403) and connect a multimeter (ampere meter).

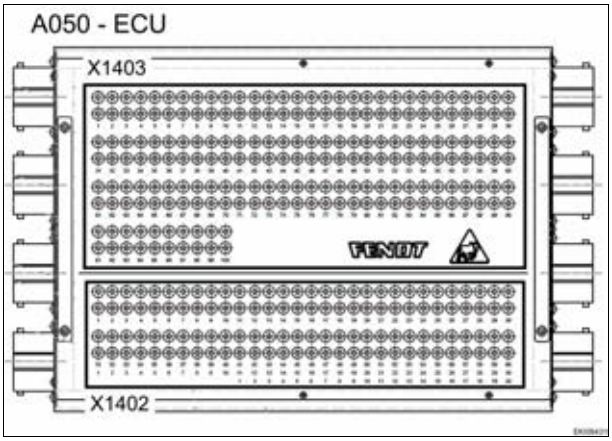


Fig. 501. I001874

Engine speed	Current draw (no gear ratio preselected)	Current draw (gear ratio preselected)	Note
800 rpm	0 ADC	0 ADC	Transmission neutral (press neutral button or apply hand brake)
			Depress clutch pedal fully

Engine speed	Current draw (no gear ratio preselected)	Current draw (gear ratio preselected)	Note
800 rpm	0.37 ADC	0.34 ADC	
1000 rpm	0.37 ADC	0.56 ADC	
1200 rpm	0.37 ADC	1.02 ADC	
1250 rpm	1.40 ADC	1.40 ADC	
1300 rpm	1.40 ADC	1.40 ADC	
1400 rpm	1.40 ADC	1.40 ADC	

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Activation signal to Y004 solenoid valve, turbo-clutch	51

NOTE: *see §31*
see §34

126 Y005 speed governor solenoid valve

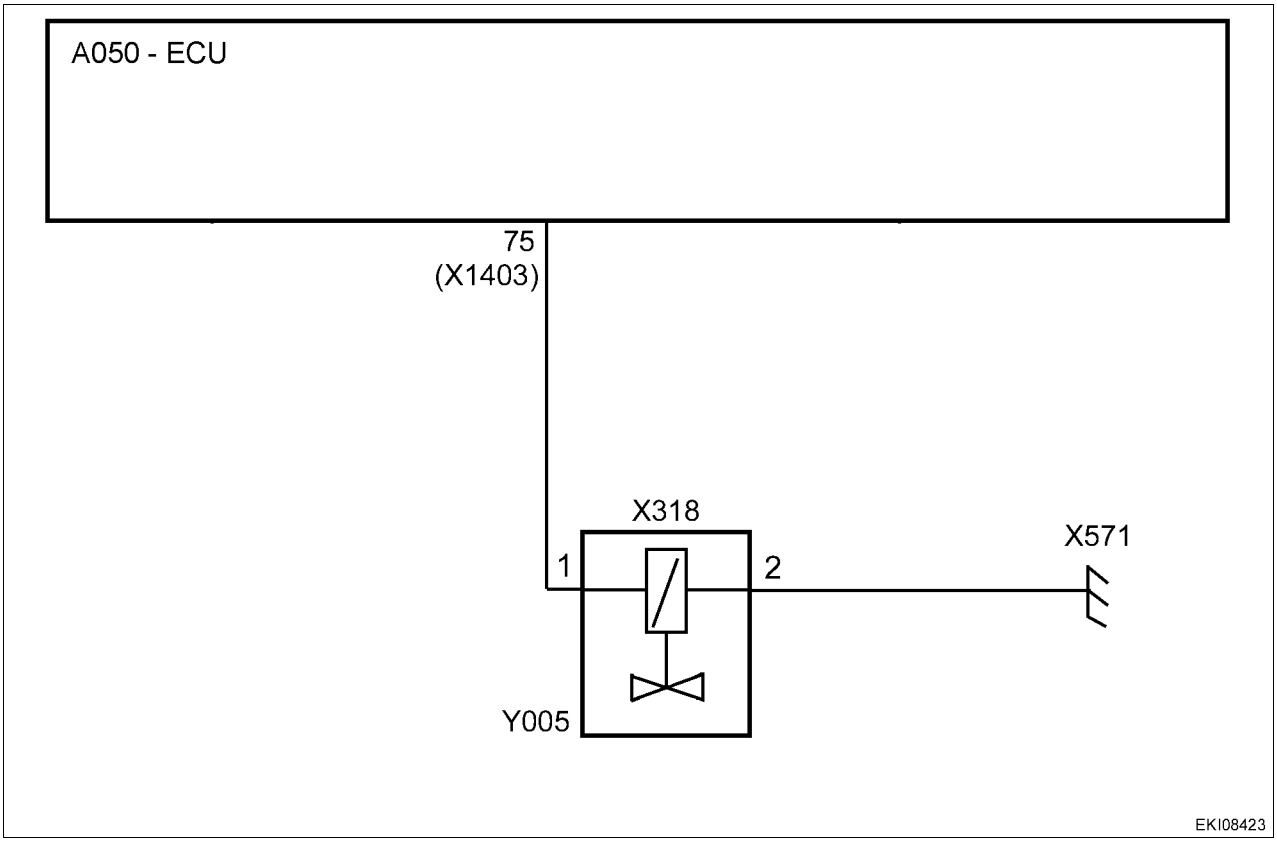


Fig. 502. I002004

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 75 (X1403)	Activation of Y005	
Y005 - Solenoid valve, speed governor		
X318	Separation point onY005	
Pin 1	Actuation	
Pin 2	Earth	
X571 earth pin		

Measuring points and signal values

Y005 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth

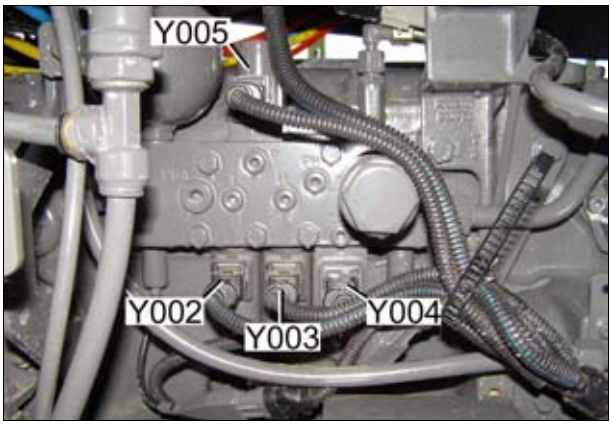


Fig. 503. I001161

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Connect adapter cable X899.980.246.201 directly to the component (plug adapter cable into the component only).
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 6.5 ohms		
Earth	2			

Measuring the power consumption

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open **pin 75** (on X1403) and connect a multimeter (ammeter)

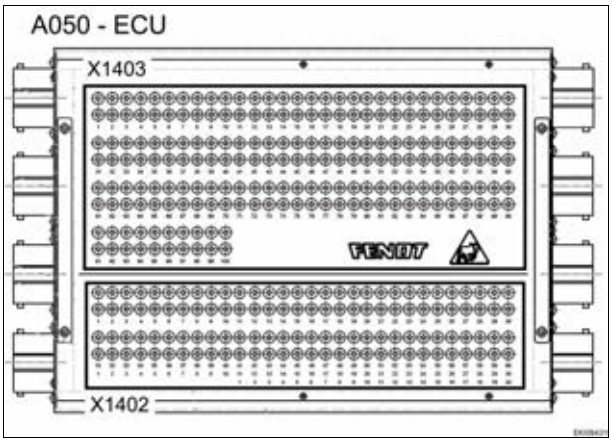


Fig. 504. I001874

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	75 (X1403)	800 +/-50 mA		If the current exceeds or falls below the specified value, the maximum speed is limited to 30 Km/h

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Activation of **Y005** - Solenoid valve, speed governor	75

NOTE: *see §31*
see §34

127 Y008 solenoid valve, rear PTO (clutch)

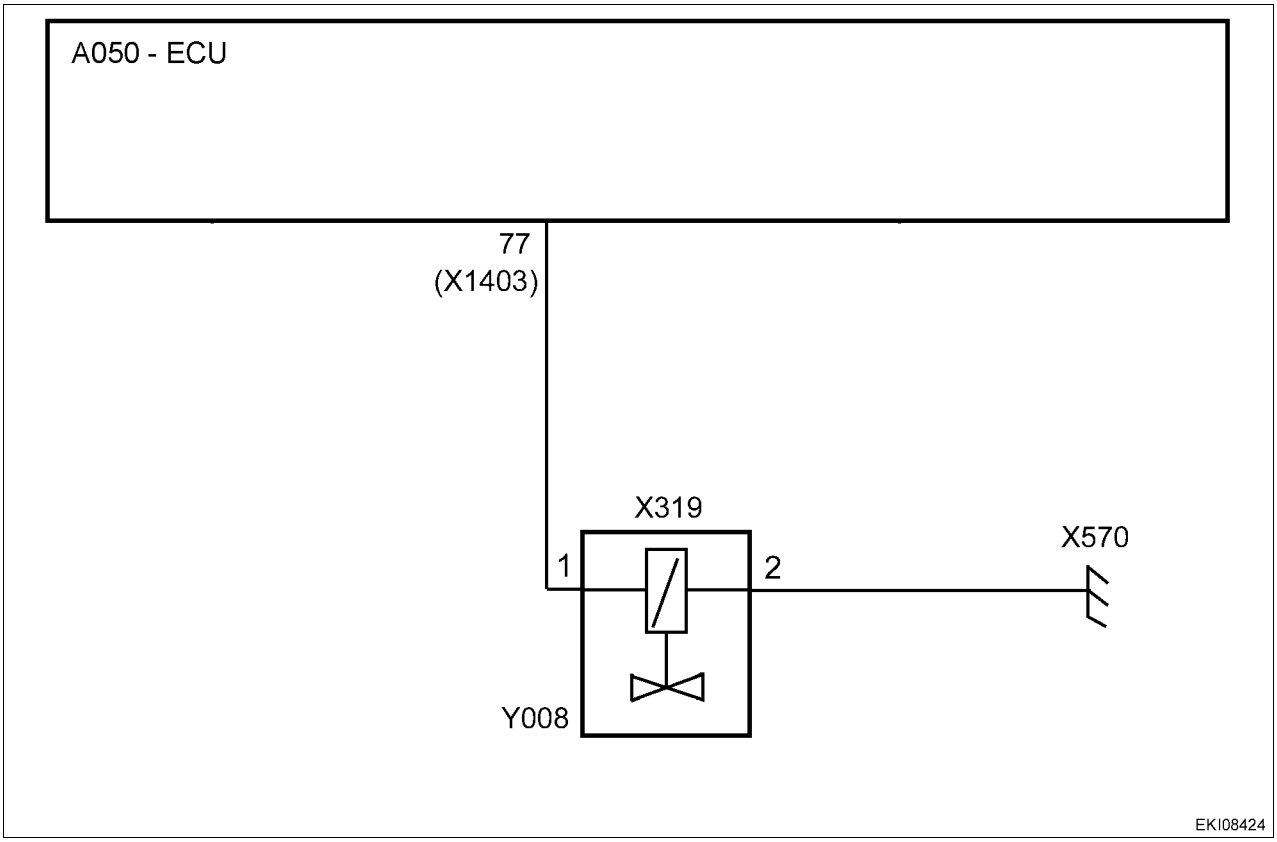


Fig. 505. I002005

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 77 (X1403)	Actuation of Y008	
Y008 - Solenoid valve, rear PTO (clutch)		
X319	Separation point on Y008	
Pin 1	Actuation	
Pin 2	Earth	
X570 earth pin		

Measuring points and signal values

Y008 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth



Fig. 506. I001168

Measuring resistance (ohms)

NOTE: *Connect adapter cable X899.980.246.201 directly to the component (plug adapter cable into the component only).*
Switch off ignition.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 8.1 ohms	20 °C Coil resistance	
Earth	2			

Measuring the voltage (V)

NOTE: *Connect the X899.980.246.201 adapter cable directly to the component*
Start engine, preselect PTO setting
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1			
		14 VDC	Switch position ON	
		0 VDC	Switch position OFF	
Earth	2			

Measuring power consumption (A)

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open pin 77 (X1403) and measure using a multimeter (ammeter).
Switch ignition on and start engine.
Preselect rear PTO stage

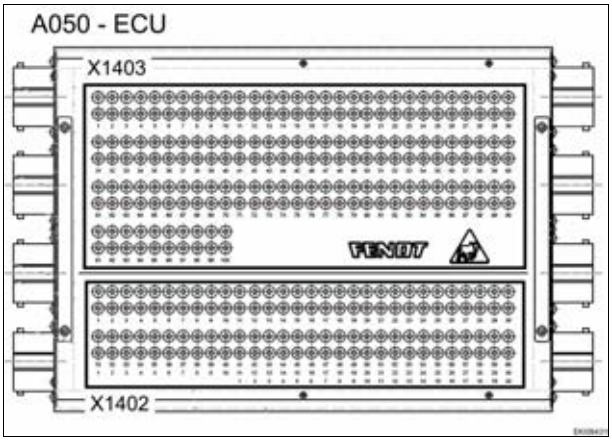


Fig. 507. I001874

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	77			
		1.7 ADC	Switch position ON	
		0 ADC	Switch position OFF	

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Activation of **Y008** - Solenoid valve, rear PTO (clutch)	77
Earth	22

NOTE: *see §31*
see §34

Check pressure on rear PTO clutch.
NOTE: *see §4*

128 Y009 4WD solenoid valve

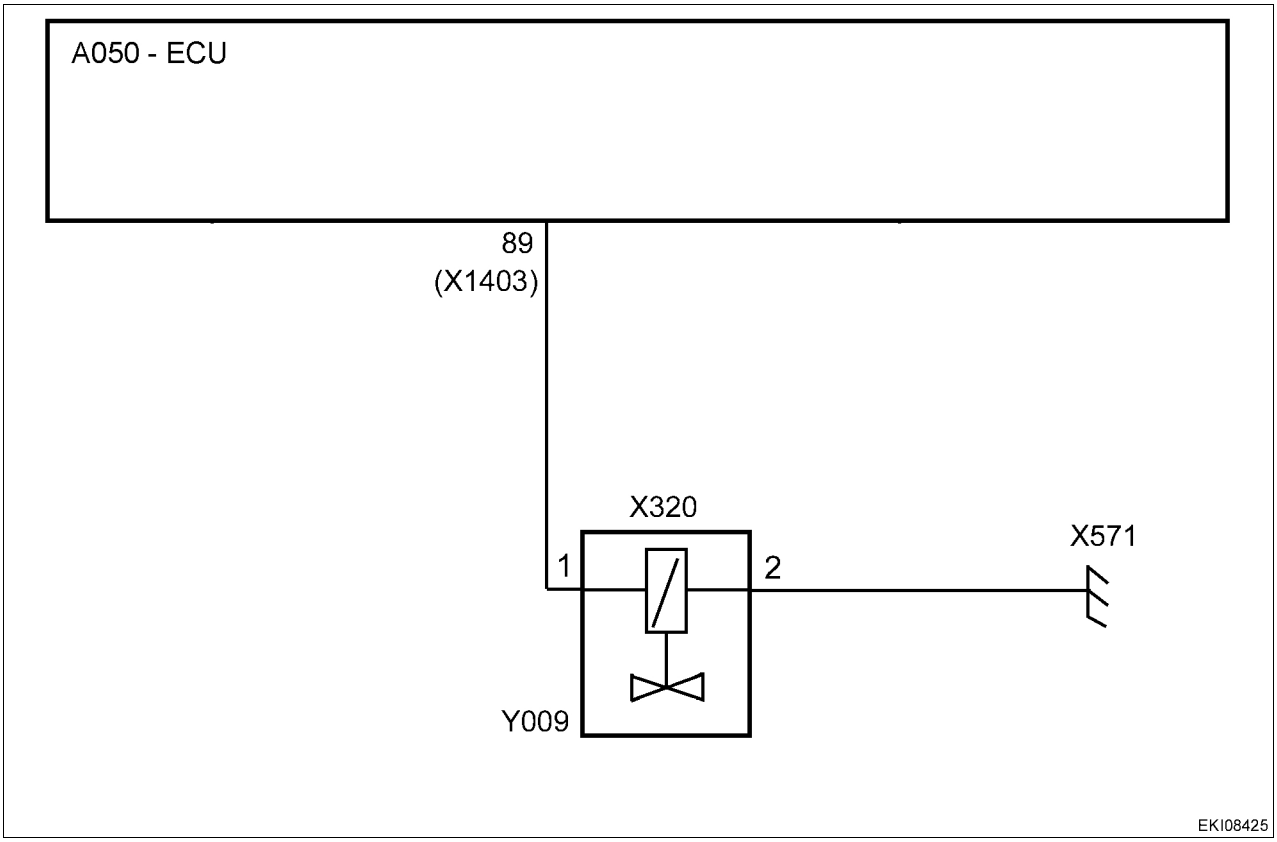


Fig. 508. I002022

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 89 (X1403)	Actuation of Y009	
Y009 - Solenoid valve, 4WD		
X320	Separation point on Y009	
Pin 1	Actuation	
Pin 2	Earth	
X571 earth pin		

Measuring points and signal values

Y009 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth



Fig. 509. I001168

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Connect adapter cable X899.980.246.201 directly to the component (plug adapter cable into the component only).
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 9.4 ohms	20 °C Coil resistance	
Earth	2			

Measuring the voltage (V)

NOTE: *Connect the X899.980.246.201 adapter cable directly to the component*
Start engine.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1			
		0 VDC	Switch position ON	
		14 VDC	Switch position OFF	
Earth	2			

Measuring power consumption (A)

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open pin 89 (X1403) and measure using a multimeter (ammeter)
Switch ignition on and start engine.

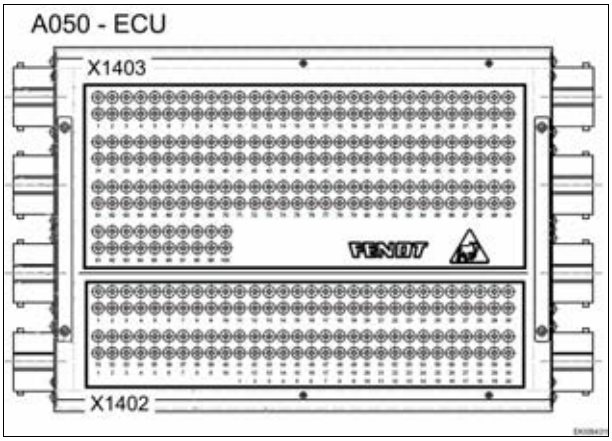


Fig. 510. I001874

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	89			
		0 ADC	Switch position ON	
		1.5 ADC	Switch position OFF	

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Activation of **Y009** - Solenoid valve, 4WD	89
Earth	22

NOTE: *see §30*
see §34

Checking pressure on 4WD clutch
NOTE: *see §4*

129 Y010 solenoid valve, differential lock

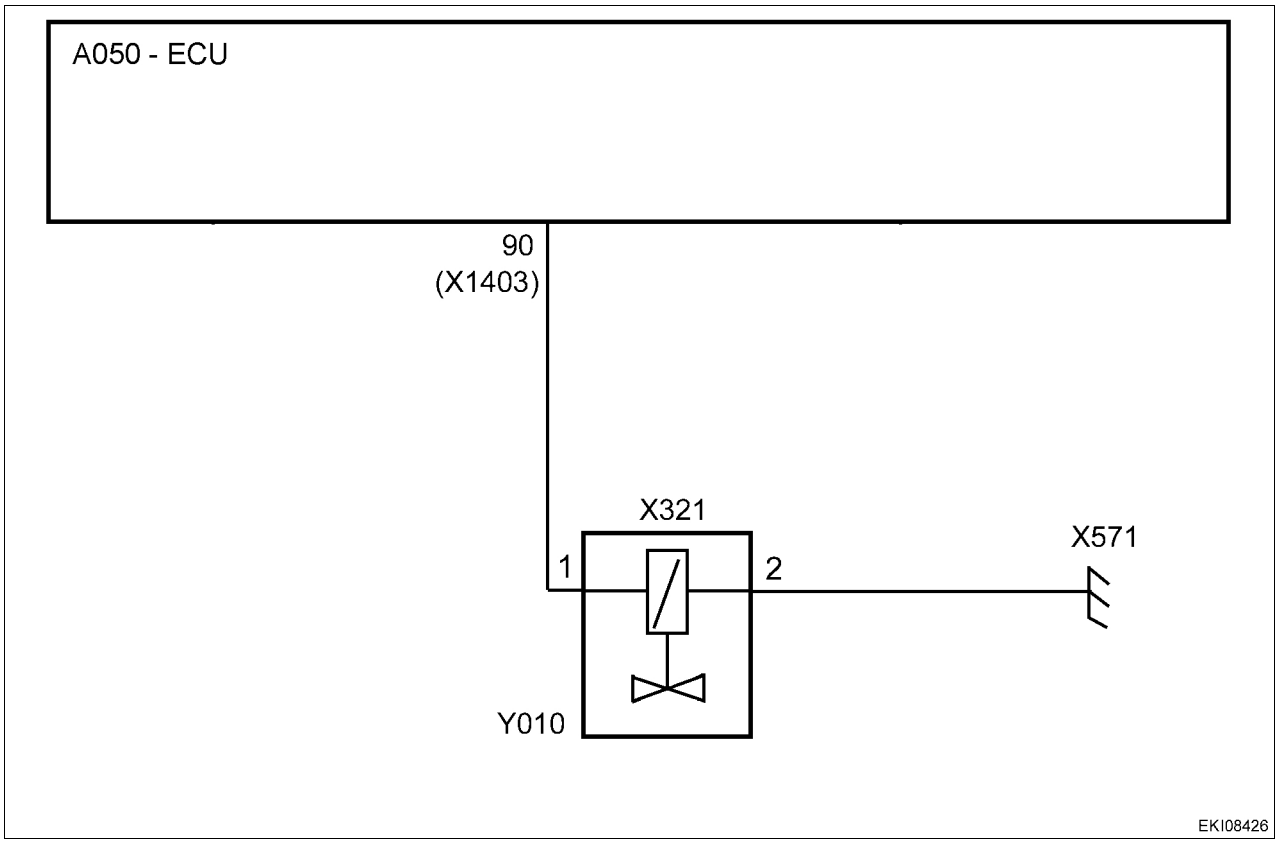


Fig. 511. I002023

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 90 (X1403)	Actuation of Y010	
Y010 - Solenoid valve, differential lock		
X321	Separation point on Y010	
Pin 1	Actuation	
Pin 2	Earth	
X571 earth pin		

Measuring points and signal values

Y010 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth



Fig. 512. I001168

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Connect adapter cable X899.980.246.201 directly to the component (plug adapter cable into the component only).
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 9.4 ohms	20 °C Coil resistance	
Earth	2			

Measuring the voltage (V)

NOTE: *Connect the X899.980.246.201 adapter cable directly to the component*
Start engine.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1			
		14 VDC	Switch position ON	
		0 VDC	Switch position OFF	
Earth	2			

Measuring power consumption (A)

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open pin 90 (X1403) and measure using a multimeter (ammeter).
Switch ignition on and start engine.

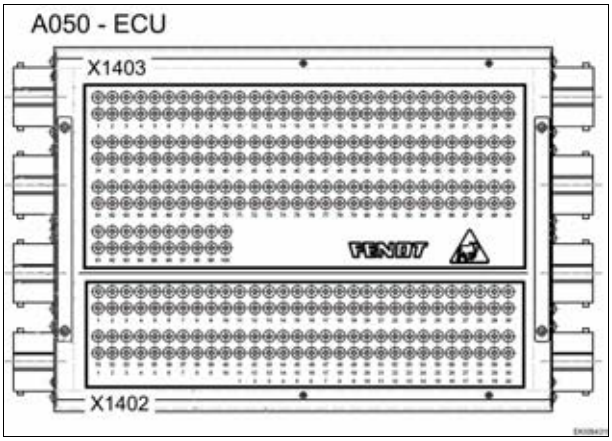


Fig. 513. I001874

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	90			
		1.5 ADC	Switch position ON	
		0 ADC	Switch position OFF	

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Activation of **Y010** - Solenoid valve, differential lock	90
Earth	22

NOTE: *see §30*
see §34

Check pressure on differential lock
NOTE: *see §4*

130 Y011 front PTO clutch solenoid valve

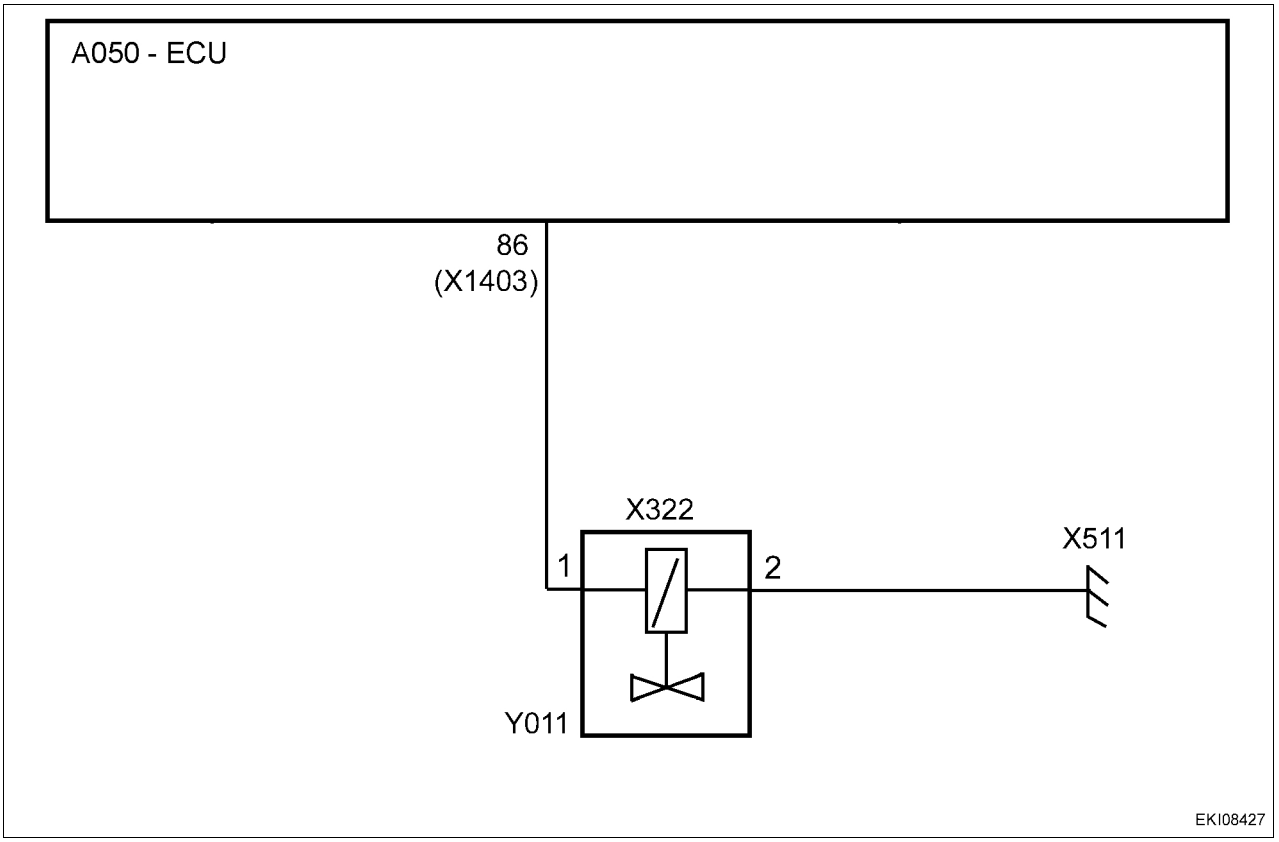


Fig. 514. I002028

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 86 (X1403)	Actuation of Y011	
Y011 - Front PTO solenoid valve (clutch)		
X322	Separation point on Y011	
Pin 1	Actuation	
Pin 2	Earth	
X511 earth pin		

Measuring points and signal values

Y011 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth



Fig. 515. I001162

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Connect adapter cable X899.980.246.201 directly to the component (plug adapter cable into the component only).
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 8.1 ohms	20 °C Coil resistance	
Earth	2			

Measuring the voltage (V)

NOTE: *Connect the X899.980.246.201 adapter cable directly to the component*
Start engine.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1			
		14 VDC	Switch position ON	
		0 VDC	Switch position OFF	
Earth	2			

Measuring power consumption (A)

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open pin 86 (X1403) and measure using a multimeter (ammeter).
Switch ignition on and start engine.

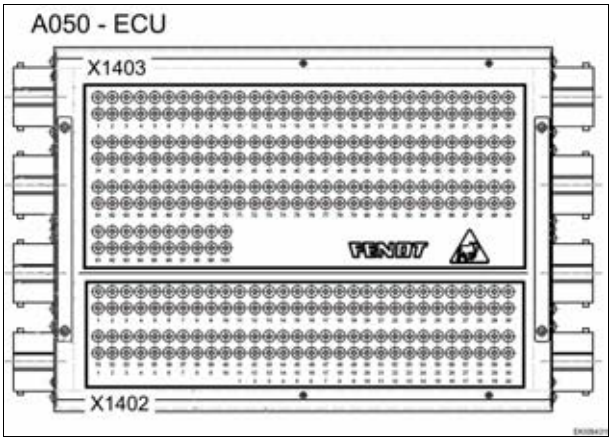


Fig. 516. I001874

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	86			
		1.7 ADC	Switch position ON	
		0 ADC	Switch position OFF	

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Activation of **Y011** - Front PTO solenoid valve (clutch)	86
Earth	22

NOTE: *see §30*
see §34

Check pressure on front PTO clutch
NOTE: *see §4*

131 Y012 charging solenoid valve

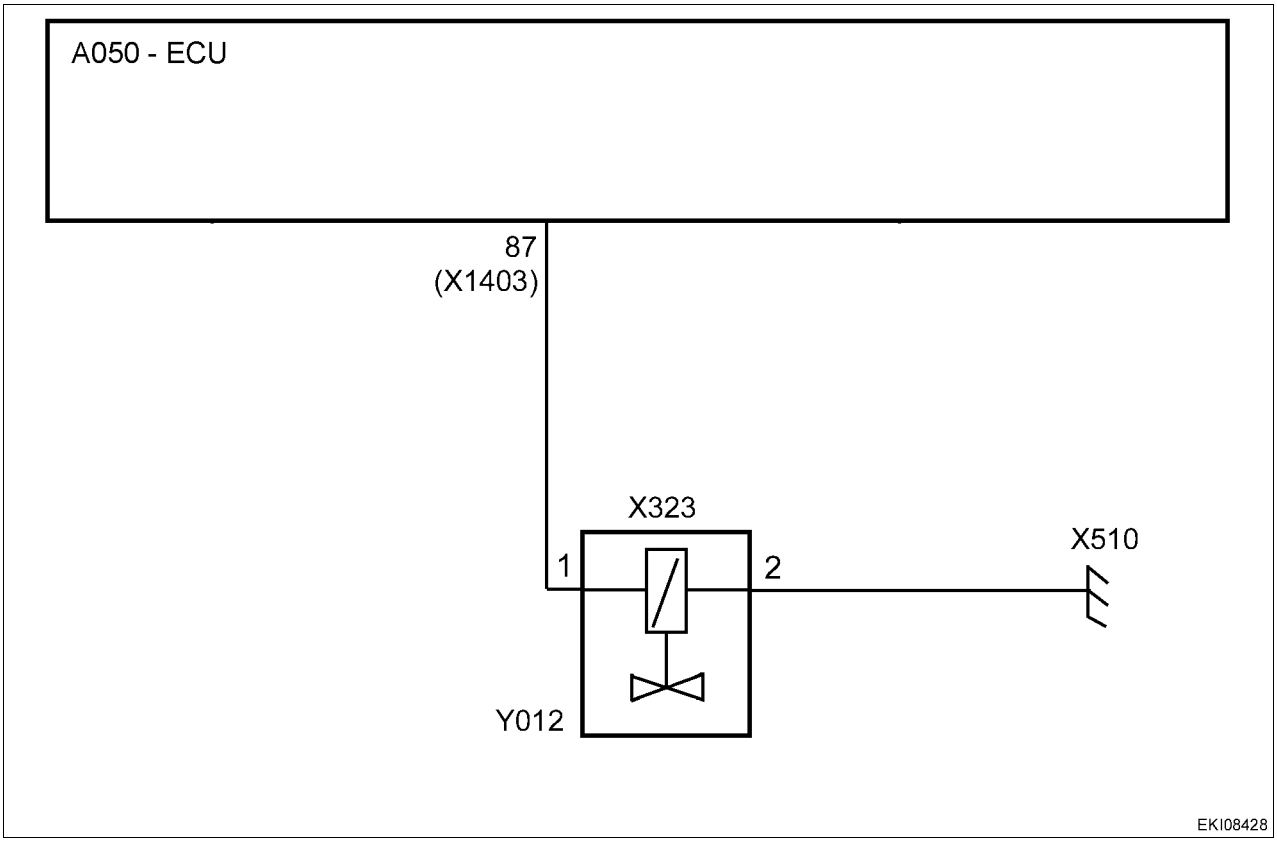


Fig. 517. I002026

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 87 (X1403)	Actuation of Y012	
Y012 - Oil pre-heater/load suspension solenoid valve		
X323	Separation point on Y012	
Pin 1	Actuation	**This Y012 - Oil pre-heater/load suspension solenoid valve is energised, if:** –The front axle suspension is raised or lowered (Y064, Y065 solenoid valve) – The hydraulic oil preheater (Y060, Y061 solenoid valve) responds
Pin 2	Earth	
X510 earth pin		

Measuring points and signal values

Y012 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth



Fig. 518. I001173

Measuring resistance (ohms)

NOTE: *Switch off ignition*
Connect adapter cable X899.980.246.201 directly to the component (plug adapter cable into the component only).
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 8.1 ohms	20 °C Coil resistance	
Earth	2			

Measuring the voltage (V)

NOTE: *Connect the X899.980.246.201 adapter cable directly to the component*
Start engine.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1			
		14 VDC	Switch position ON	
		0 VDC	Switch position OFF	
Earth	2			

Measuring power consumption (A)

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open pin 87 (X1403) and measure using a multimeter (ammeter).
Switch ignition on and start engine.

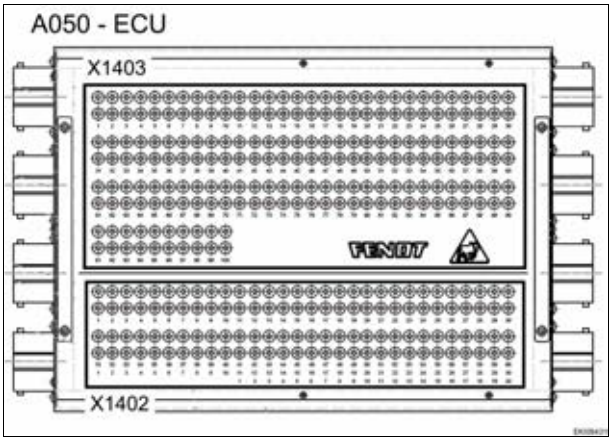


Fig. 519. I001874

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	87			
		1.7 ADC	Switch position ON	
		0 ADC	Switch position OFF	

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Activation of **Y012** - Oil pre-heater/load suspension solenoid valve	87
Earth	22

NOTE: *see §30*
see §34

Hydraulically checking Y012 charging solenoid valve

M4 **Measuring point, LS pressure**
Connect pressure gauge (measuring range 250 bar).
Raise or lower front axle suspension (press button for more than 3 seconds).

Target value: 200 bar



Right side of tractor, on central control block.

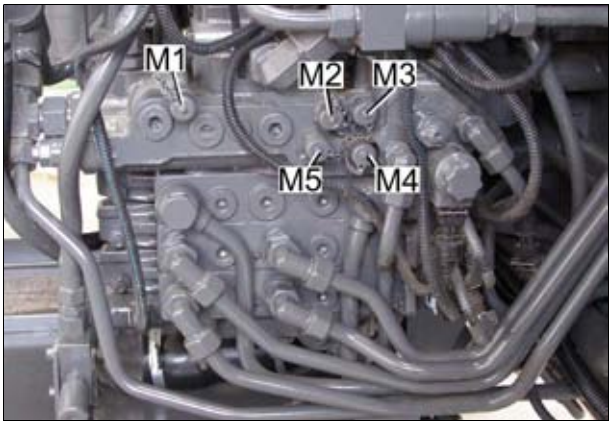


Fig. 520. I001210

132 Y021/Y022 raise/lower solenoid valve (standard front power lift)

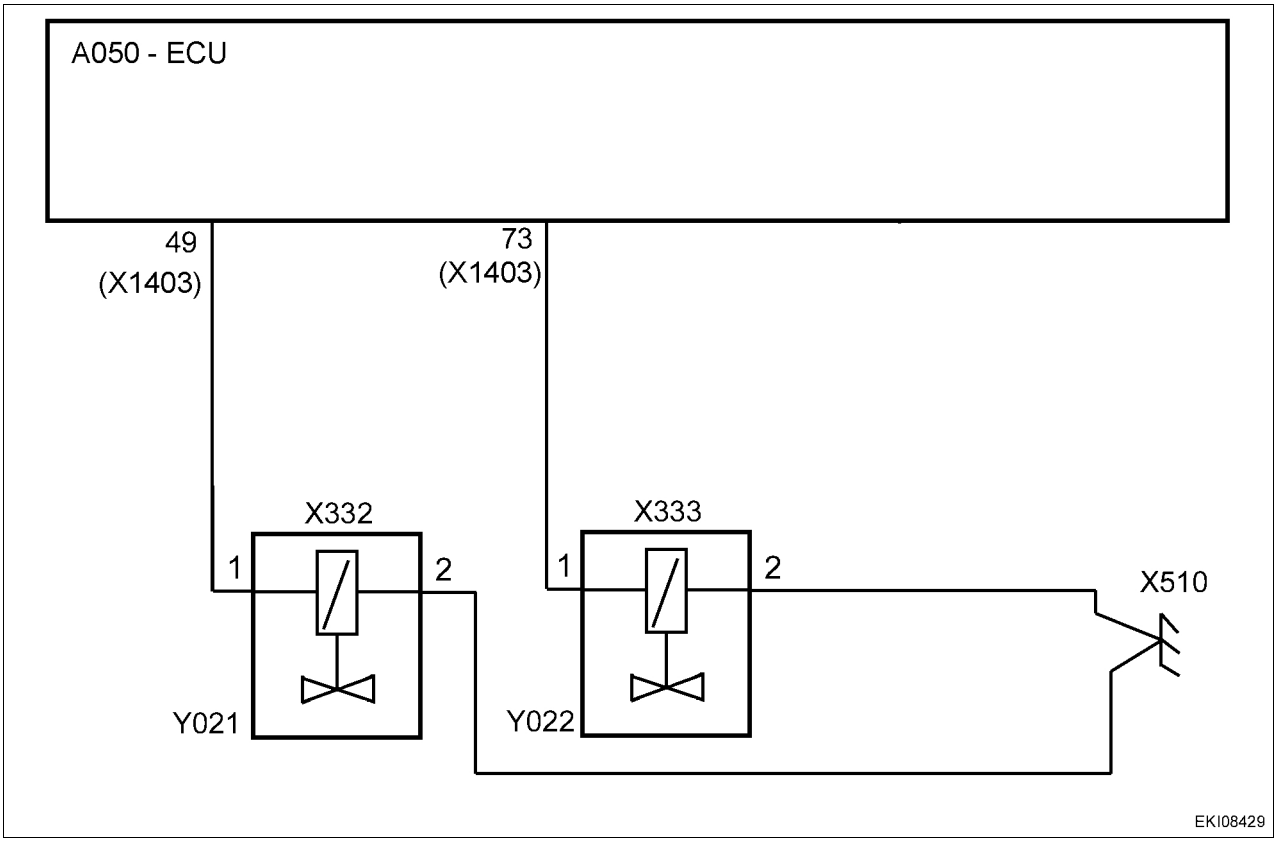


Fig. 521. I002027

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 49 (X1403)	Activation of **Y021** - Lifting solenoid valve (standard front power lift)	
Pin 73 (X1403)	Activation of **Y022** - Lowering solenoid valve (standard front power lift)	
Y021 - Lifting solenoid valve (standard front power lift)		
X332	Separation point on Y021	
Y022 - Lowering solenoid valve (standard front power lift)		
X333	Separation point on Y003	
Pin 1	Signal	
Pin 2	Earth	
X510 earth pin		

Measuring points and signal values

Y021/Y022 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth

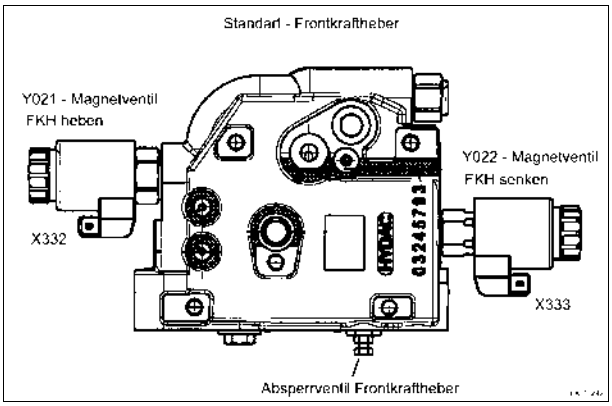


Fig. 522. I001306

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Connect the adapter cable X899.980.246.201 directly to the component (plug adapter cable directly into the component).
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 9.4 ohms		
Earth	2			

Measuring the voltage (V)

NOTE: *Connect the X899.980.246.201 adapter cable directly to the component*
Start engine.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1			
		14 VDC	Switch position ON	
		0 VDC	Switch position OFF	
Earth	2			

Measuring power consumption (A)

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open pin 49 or 73 (X1403) and measure using a multimeter (ammeter).
Switch ignition on and start engine.

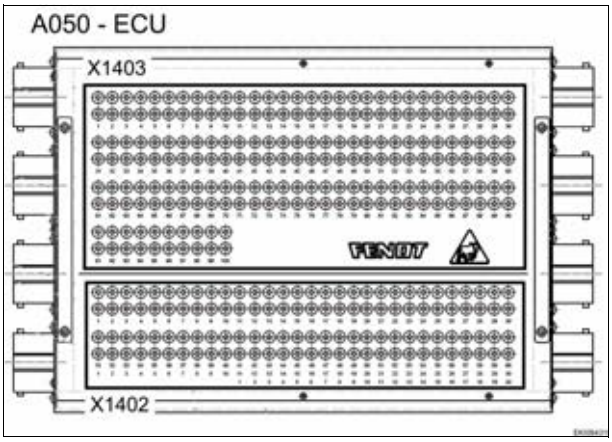


Fig. 523. I001874

Y021 *- Lifting solenoid valve (standard front power lift)*

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	49			
		1.5 ADC	Switch position Raise	
		0 ADC	Switch position Lower	

Y022 *- Lowering solenoid valve (standard front power lift)*

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	73			
		1.5 ADC	Switch position Lower	
		0 ADC	Switch position Raise	

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Activation of **Y021** - Lifting solenoid valve (standard front power lift)	49
Activation of **Y022** - Lowering solenoid valve (standard front power lift)	73
Earth	22

NOTE: *see §24*
see §34

133 Y021 lock valve, front pressure compensator

NOTE: *The Y021 solenoid is energised when:*
The front power lift is in SA mode and the front power lift is lowered.

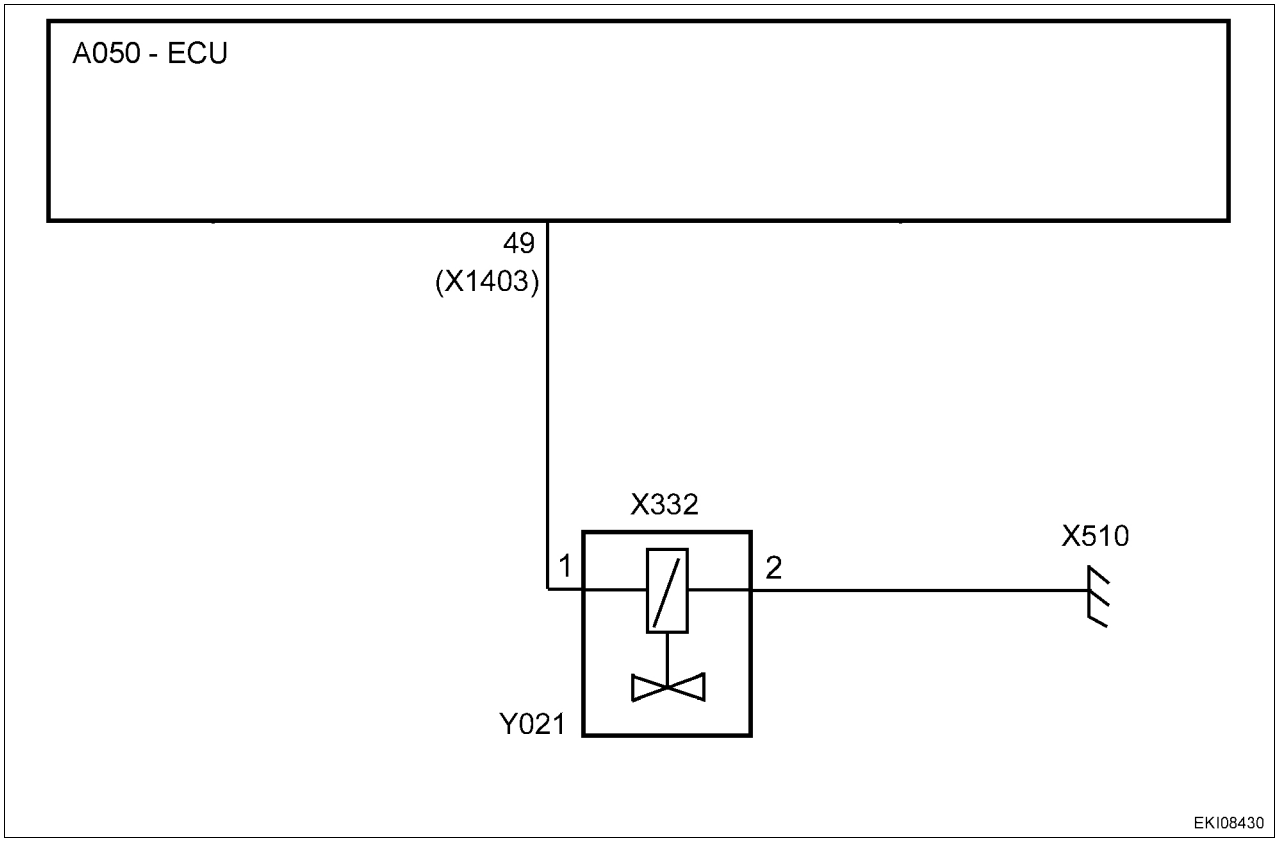


Fig. 524. I002061

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 49 (X1403)	Actuation of Y021	
Y021 - Front pressure compensator lock valve		
X332	Separation point on Y021	
Pin 1	Actuation	
Pin 2	Earth	
X510 earth pin		

Measuring points and signal values

Y021 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth

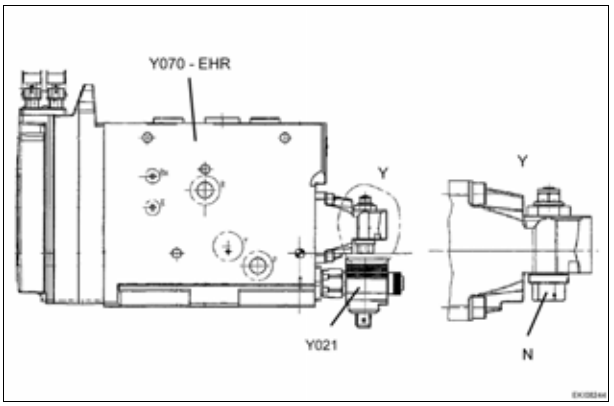


Fig. 525. I001893

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Connect adapter cable X899.980.246.201 directly to the component (plug adapter cable into the component only).
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 9.4 ohms	20 °C Coil resistance	
Earth	2			

Measuring the voltage (V)

NOTE: *Connect the X899.980.246.201 adapter cable directly to the component*
Start engine.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1			
		14 VDC	Switch position ON	
		0 VDC	Switch position OFF	
Earth	2			

NOTE: *If the **A050** - ECU, basic control unit detects that the front power lift is no longer lowering (no signal change on the **B040** - Sensor, front power lift position),*
*before the working depth (depth control) has been reached, the EHR cut-off valve switches to floating position (**Y021** - Front pressure compensator lock valve de-energised).*

Measuring power consumption (A)

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open pin 49 (X1403) and measure using a multimeter (ammeter).
Switch ignition on and start engine.

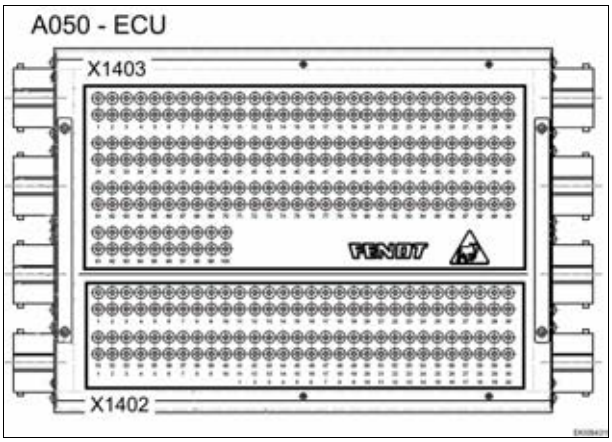


Fig. 526. I001874

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	49			
		1.5 ADC	Switch position ON	
		0 ADC	Switch position OFF	

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Activation of **Y021** - Front pressure compensator lock valve	49
Earth	22

NOTE: *see §25*
see §34

134 Y022 solenoid valve, field pressure control (front)

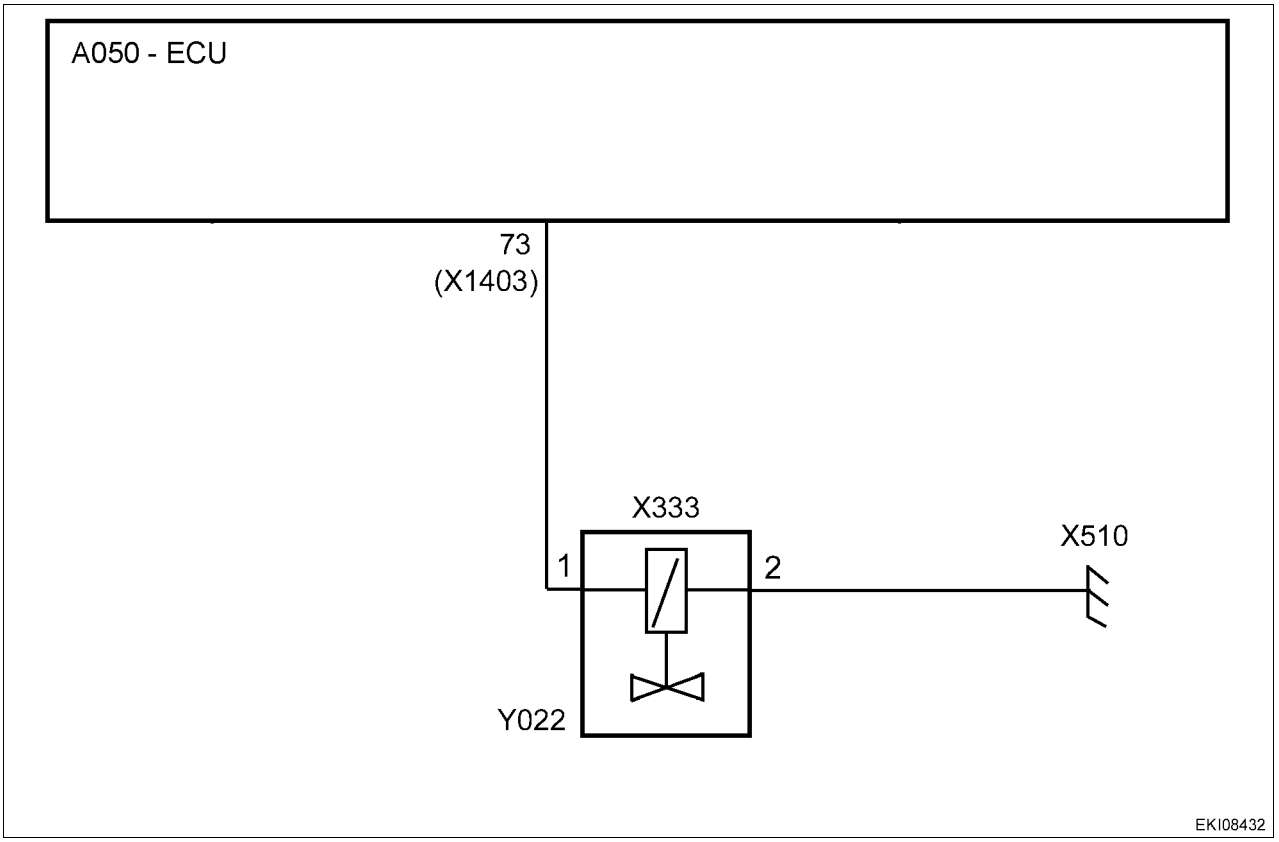


Fig. 527. I002063

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 73 (X1403)	Actuation of Y022	
Y022 - Field pressure control solenoid valve (front),		
X333	Separation point on Y022	
Pin 1	Actuation	
Pin 2	Earth	
X510 earth pin		

Measuring points and signal values

Y022 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth



Fig. 528. I001716

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Connect adapter cable X899.980.246.201 directly to the component (plug adapter cable into the component only).
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 5.0 ohms	20 °C Coil resistance	
Earth	2			

Measuring the voltage (V)

NOTE: *Connect the X899.980.246.201 adapter cable directly to the component*
Start engine.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1			
		5.8 VDC	3 bar (minimum)	
		4.8 VDC	15 bar	
		4.6 VDC	30 bar	
		4.1 VDC	50 bar	
Earth	2			

Measuring power consumption (A)

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open pin 73 (X1403) and measure using a multimeter (ammeter).
Switch ignition on and start engine.

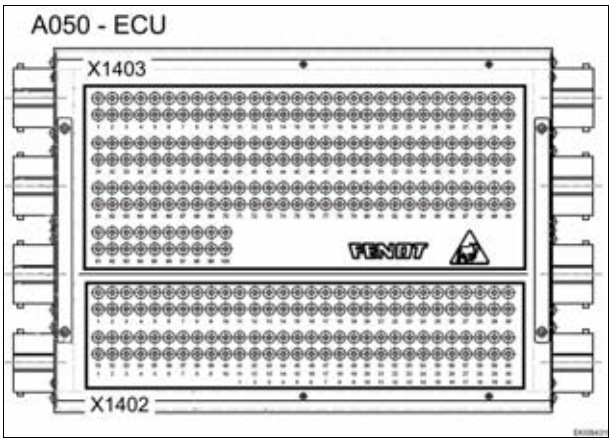


Fig. 529. I001874

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	73			
		1.10 ADC	3 bar (minimum)	
		0.90 ADC	15 bar	
		0.87 ADC	30 bar	
		0.80 ADC	50 bar	

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Activation of **Y022** - Field pressure control solenoid valve (front),	73
Earth	22

NOTE: *see §25*
see §34

Adjusting the field pressure

The field pressure can be changed in DA (double-acting) mode.
Call up second sub-menu of the front EHR.

The field pressure can be changed in DA mode from **3 bar to 50 bar**.

Make adjustments:

- Rotate setting knob (B), until the desired position (C) is reached.
- Press setting knob (B)
- Display (C) changes from green to red
- Rotate setting knob (B), settings (A) are changed and saved.
- Press setting knob (B)
- Display (C) changes from red to green and jumps to the next setting option.

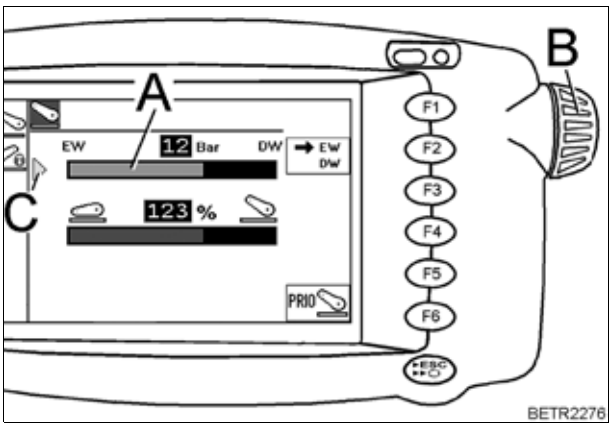


Fig. 530. I004839

NOTE: *In DA mode, the maximum field pressure is limited to 50 bar.*
It is not possible to jack up the tractor.

135 Y024 magnetic clutch, air conditioning compressor

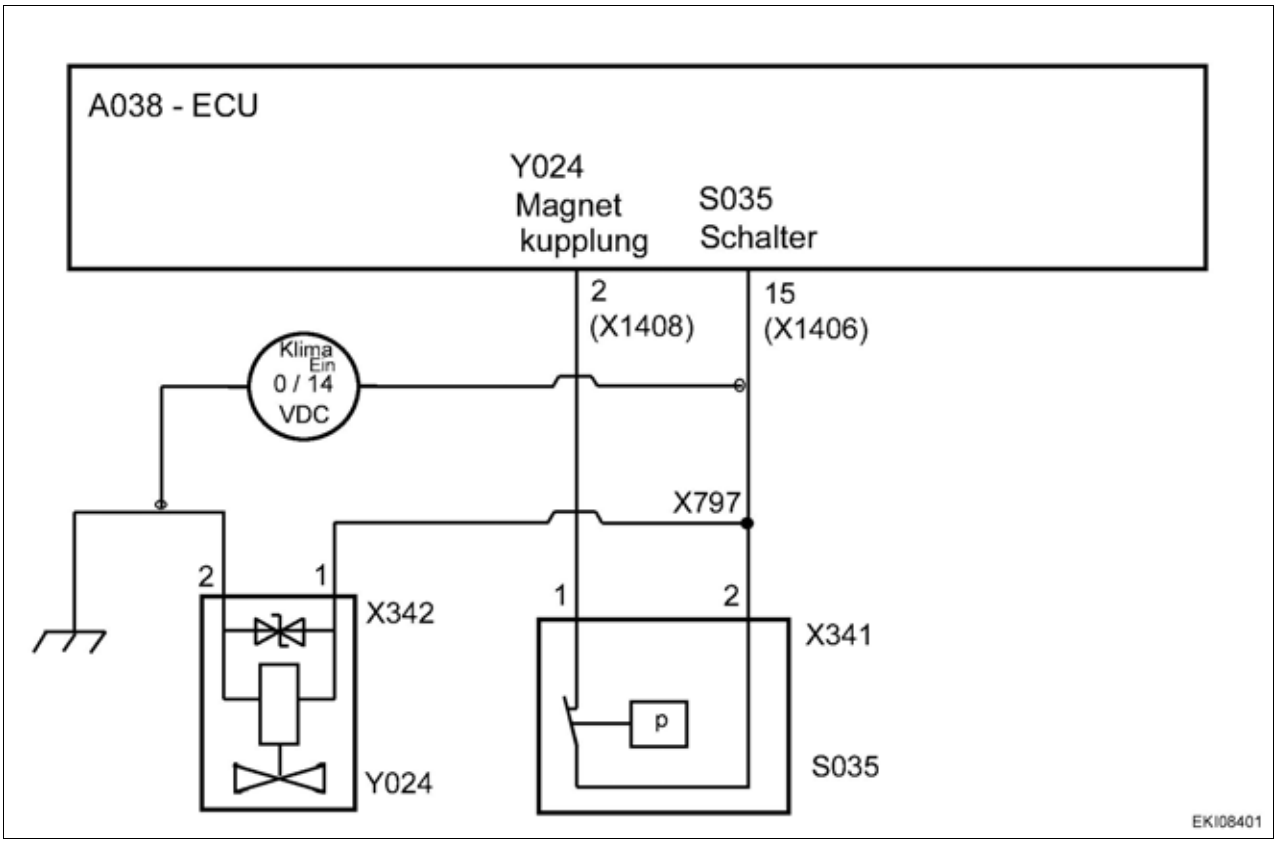


Fig. 531. I002377

Item	Designation	Note
A038 - ECU, central electrical system		
X1406	Separation point on A038	
X1408	Separation point on A038	
Pin 15 (X1406)	S035 switch	
Pin 2 (X1408)	Y024 magnetic clutch	
S035 - Switch, high-pressure/low-pressure (air conditioning system)		
X341	Separation point on S035	
Pin 1	Actuation	
Pin 2	Actuation	
Y024 - Magnetic clutch, air conditioning compressor		
X342	Separation point on Y024	
Pin 1	+UB	
Pin 2	Earth	
X797 connector (+UB)		

Measuring points and signal values

Y024 magnetic clutch	
Pin	**Function**
1	Actuation



Fig. 532. I001163

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Using multimeter (ohmmeter),
measure pin 1 on component and vehicle earth.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 4.1 +/- 0.5 ohms	20 °C Coil resistance	
Vehicle earth				

Measuring voltage and power consumption

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see §16*

Prerequisite for this measurement:

– Use the **vehicle earth** to **earth**

Measuring voltage (V):
Measure pin 15 (X1406) and **vehicle earth** using a multimeter (voltmeter).
Switch ignition on and start engine.
Switch on air conditioning system.

Measuring power consumption (A):
Open pin 2 (X1408) and measure using a multimeter (ammeter).
Switch ignition on and start engine.
Switch on air conditioning system.

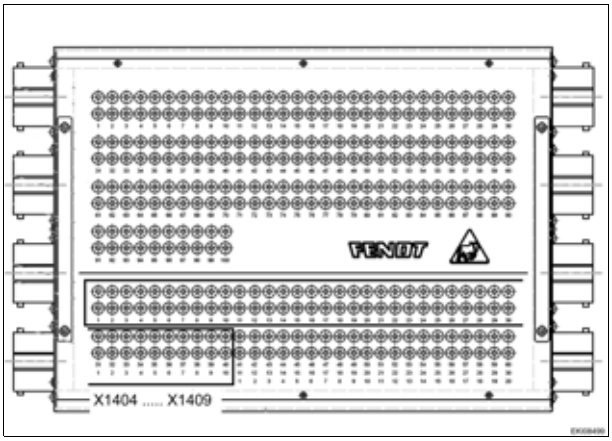


Fig. 533. I002060

Status	Voltage	Current draw
Air conditioning system OFF (magnetic clutch on air conditioning compressor open)	0 VDC	0 ADC
Air conditioning system ON (magnetic clutch on air conditioning compressor closed)	14 VDC	3.5 ADC

NOTE: *see §12*

Press button (N) to switch on **"Cool mode".**
In Cool mode, a temperature that has been set is kept constant.
The set temperature is regulated without changing the fan speed.

Press the (M) buttons to preselect the **specified temperature.**

NOTE: *See also: Operating Manual*

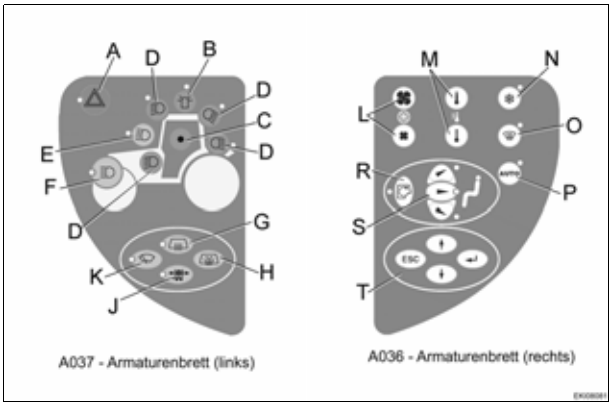


Fig. 534. I000722

Air conditioning system fault limitation
Air conditioning compressor does not switch on.

- Disconnect Y024 magnetic clutch and energise externally with 12 VDC (test: magnetic clutch engages)
- Check S035 high/low-pressure switch for continuity (check refrigerant circuit)
- Check all separation points for continuity

136 Y026/Y027 solenoid valve, rear PTO stage 540 (540E) / 1000

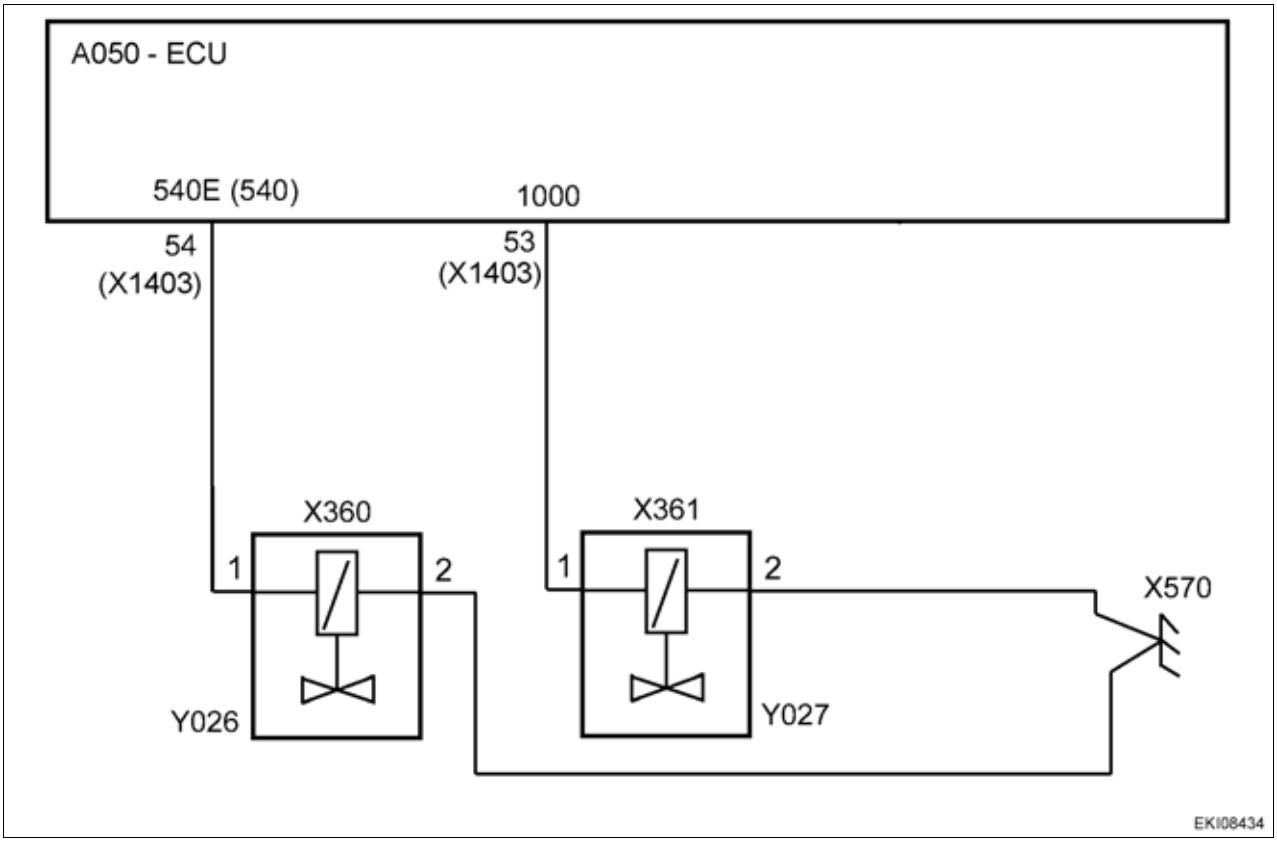


Fig. 535. I002065

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 54 (X1403)	Activation of **Y026** - Solenoid valve, rear PTO, stage I	Standard: 540E Optional: 540
Pin 53 (X1403)	Activation of **Y027** - Solenoid valve, rear PTO, stage II	
Y026 - Solenoid valve, rear PTO, stage I		
X360	Separation point on Y026	
Y027 - Solenoid valve, rear PTO, stage II		
X361	Separation point on Y027	
Pin 1	Signal	
Pin 2	Earth	
X570 earth pin		

Measuring points and signal values

Y026/Y027 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth



Fig. 536. I001168

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Connect adapter cable X899.980.246.201 directly to the component (plug adapter cable into the component only).
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 9.4 ohms		
Earth	2			

Measuring the voltage (V)

NOTE: *Connect the X899.980.246.201 adapter cable directly to the component*
Start engine.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1			
		14 VDC	Switch position ON	
		0 VDC	Switch position OFF	
Earth	2			

Measuring power consumption (A)

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open pin 53 or 54 (X1403) and measure using a multimeter (ammeter).
Switch ignition on and start engine.

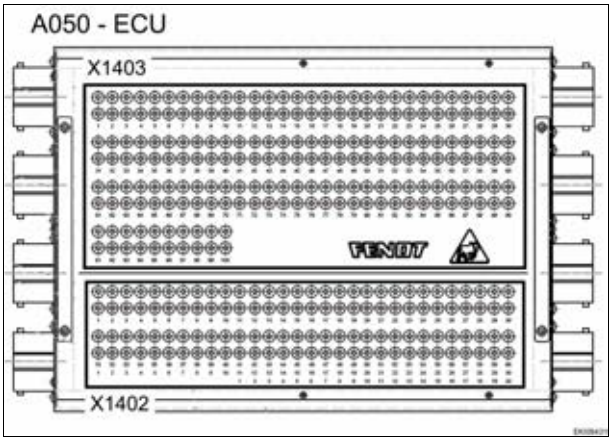


Fig. 537. I001874

Y026 *- Solenoid valve, rear PTO, stage I*

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	54			
		1.5 ADC	Switch position ON	
		0 ADC	Switch position OFF	

Y027 *- Solenoid valve, rear PTO, stage II*

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	53			
		1.5 ADC	Switch position ON	
		0 ADC	Switch position OFF	

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Activation of **Y026** - Solenoid valve, rear PTO, stage I	54
Activation of **Y027** - Solenoid valve, rear PTO, stage II	53
Earth	22

NOTE: *see §28*
see §34

137 Y032 control pressure solenoid valve

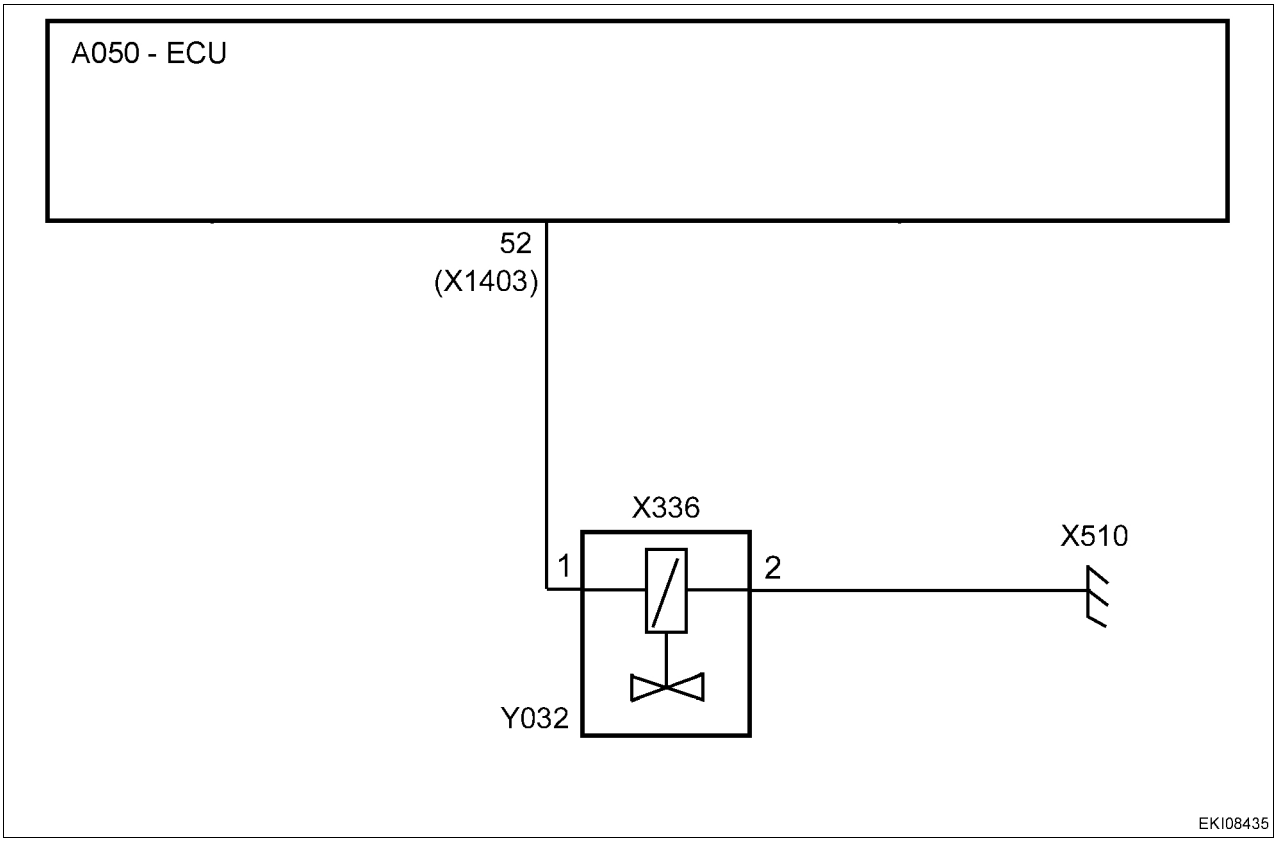


Fig. 538. I002066

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 52 (X1403)	Actuation of Y032	
Y032 - Control pressure solenoid valve **Control pressure of 22 bar for operation of:** **- Electr. Auxiliary control valves** **- EHR rear power lift** **– Front power lift**		
X336	Separation point on Y032	
Pin 1	Actuation	
Pin 2	Earth	
X510 earth pin		

Measuring points and signal values

Y032 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth



Fig. 539. I001174

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Connect adapter cable X899.980.246.201 directly to the component (plug adapter cable into the component only).
All readings +/- 25%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 11.0 ohms	20 °C Coil resistance	
Earth	2			

Measuring the voltage (V)

NOTE: *Connect the X899.980.246.201 adapter cable directly to the component*
Start engine.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1			
		14 VDC	Switch position ON	
		0 VDC	Switch position OFF	
Earth	2			

Measuring power consumption (A)

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open pin 52 (X1403) and measure using a multimeter (ammeter).
Switch ignition on and start engine.

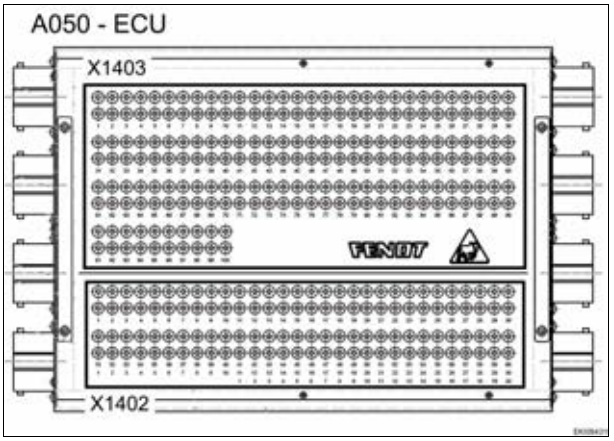


Fig. 540. I001874

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	52			
		1.2 ADC	Switch position ON	
		0 ADC	Switch position OFF	

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Activation of **Y032** - Control pressure solenoid valve	52
Earth	22

NOTE: *see §21*
see §34

138 Y053 active hold function solenoid valve

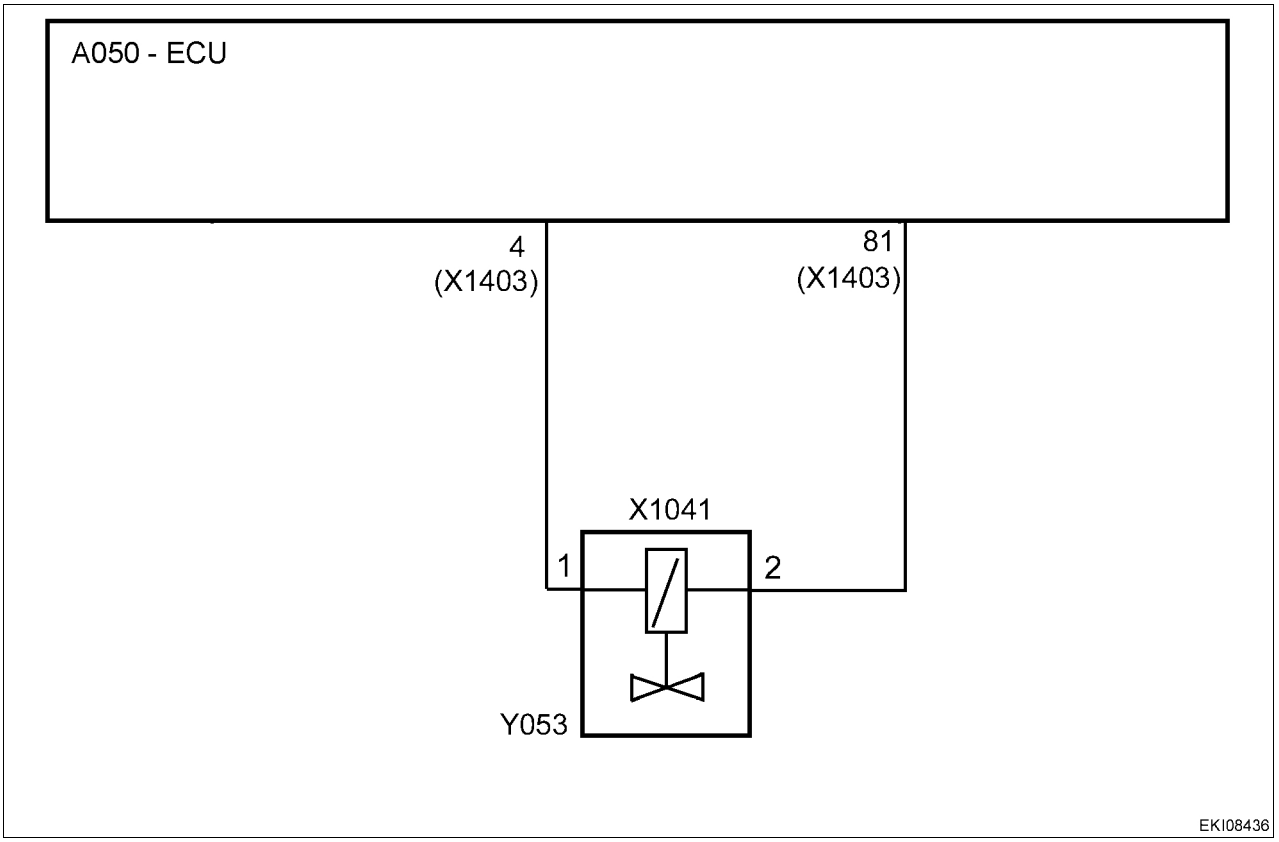


Fig. 541. I002067

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 4 (X1403)	Actuation (high) of Y053	
Pin 81 (X1403)	Actuation (low) of Y053 "virtual earth"	
Y053 - Active hold function solenoid valve		
X1041	Separation point on Y053	
Pin 1	Actuation	
Pin 2	Actuation	

Measuring points and signal values

Y053 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth



Fig. 542. I001303

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Measure pins directly on the component
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 9.4 ohms	20 °C Coil resistance	
Earth	2			

Measuring the voltage (V)

NOTE: *Connect the X899.980.304.000 adapter box to the A050 ECU, basic control unit.*
Measure pin 4 (X1403) and pin 81 (X1403)
Start engine.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	4			
		14 VDC	Switch position ON	
		0 VDC	Switch position OFF	
"Virtual" earth	81			

Measuring power consumption (A)

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open pin 4 (X1403) and measure using a multimeter (ammeter).
Switch ignition on and start engine.

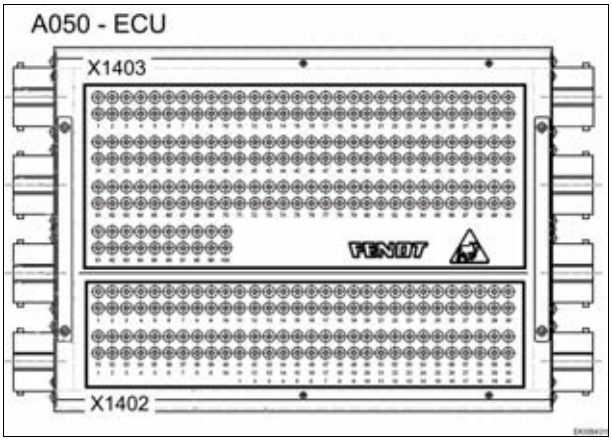


Fig. 543. I001874

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	4			
		1.5 ADC	Switch position ON	
		0 ADC	Switch position OFF	

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Activation of **Y053** - Active hold function solenoid valve	4
"Virtual" earth	81

NOTE: *see §32*
see §34

139 Y055 lock valve, rear pressure compensator

NOTE: *The Y055 solenoid valve is energised when:*
The rear power lift is in SA mode and the rear power lift is lowered.

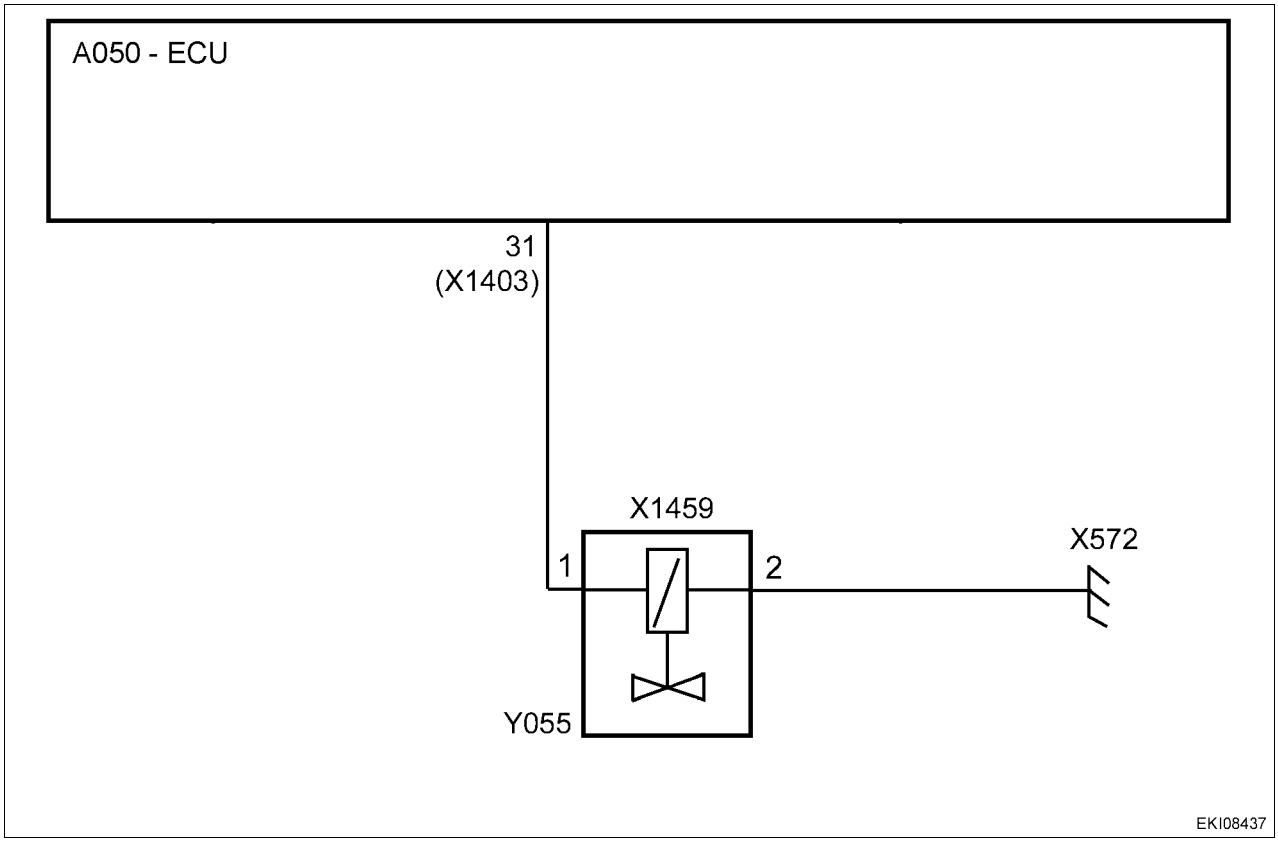


Fig. 544. I002068

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 31 (X1403)	Actuation of Y055	
Y055 - Rear pressure compensator lock valve		
X1459	Separation point on Y055	
Pin 1	Actuation	
Pin 2	Earth	
X572 earth pin		

Measuring points and signal values

Y055 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth



Fig. 545. I001175

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Connect the adapter cable X899.980.246.201 directly to the component (plug adapter cable directly into the component).
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 8.4 ohms	20 °C Coil resistance	
Earth	2			

Measuring the voltage (V)

NOTE: *Connect the X899.980.246.201 adapter cable directly to the component*
Start engine.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1			
		14 VDC	Switch position ON	
		0 VDC	Switch position OFF	
Earth	2			

NOTE: *If the **A050** - ECU, basic control unit detects that the rear power lift is no longer lowering (no signal change on the **B030** - Sensor, rear power lift position),*
*before the working depth (depth control) has been reached, the EHR cut-off valve switches to floating position (**Y055** - Rear pressure compensator lock valve de-energised).*

Measuring power consumption (A)

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open pin 31 (X1403) and measure using a multimeter (ammeter).
Switch ignition on and start engine.

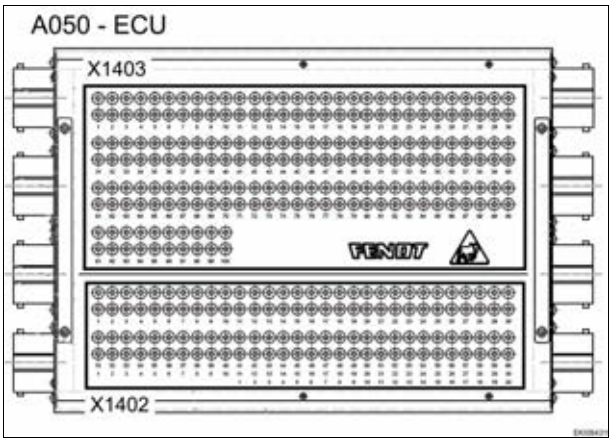


Fig. 546. I001874

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	31			
		1.2 ADC	Switch position ON	
		0 ADC	Switch position OFF	

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Activation of **Y055** - Rear pressure compensator lock valve	31
Earth	22

NOTE: *see §22*
see §34

140 Y060/Y061 solenoid valve, rear/middle hydraulic oil pre-heater

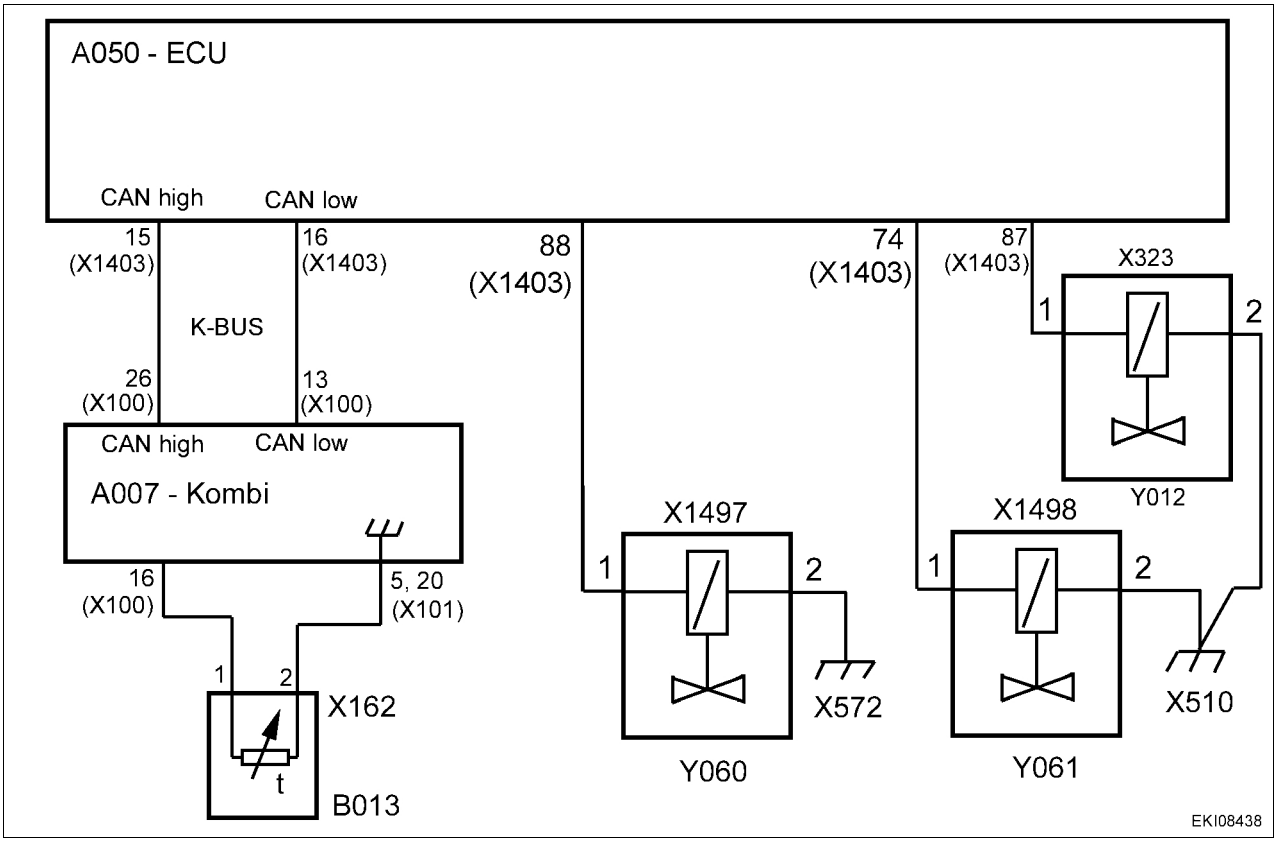


Fig. 547. I002069

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 15 (X1403)	Control bus (K bus_High)	
Pin 16 (X1403)	Control bus (K bus_Low)	
Pin 74 (X1403)	Activation of **Y061** - hydraulic oil pre-heater solenoid valve (middle)	**The Y061 - hydraulic oil pre-heater solenoid valve (middle) is only installed with the following equipment:** – Front power lift enhanced control or - Electr. auxiliary control valve, front
Pin 88 (X1403)	Activation of **Y060** - Hydraulic oil pre-heater solenoid valve (rear)	
Pin 87 (X1403)	Activation of **Y012** - Oil pre-heater/load suspension solenoid valve	When the hydraulic oil pre-heater (Y060 and Y061) is switched on, the **Y012** - Oil pre-heater/load suspension solenoid valve is also energised. The **Y012** - Oil pre-heater/load suspension solenoid valve directs load sensing pressure (LS pressure) to the LS pump (PR). The LS pump (PR) swings out and hydraulic oil is supplied.
A007 - Instrument panel		
X100	"Blue" separation point on A007	

Item	Designation	Note
X101	"Yellow" separation point on A007	
Pin 13 (X100)	Control bus (K bus_Low)	
Pin 26 (X100)	Control bus (K bus_High)	
Pin 16 (X100)	Signal from **B013** - Sensor, hydraulic oil temperature	
Pins 5 and 20 (X101)	Sensor system earth	
B013 - Sensor, hydraulic oil temperature		
X162	Separation point on B013	
Pin 1	Signal	**The hydraulic oil pre-heater engages, if:** – Hydraulic oil temperature below-5 °C **The hydraulic oil pre-heater disengages, if:** – Hydraulic oil temperature above 30 °C, (approx. 1.7 Kohms)
Pin 2	Sensor system earth	
Y012 - Oil pre-heater/load suspension solenoid valve		
X323	Separation point on Y012	See also: Chapter 9000 Reg.E – Measuring and testing Y012 charging solenoid valve.
Y060 - Hydraulic oil pre-heater solenoid valve (rear)		
X1497	Separation point on Y060	
Y061 - hydraulic oil pre-heater solenoid valve (middle)		
X1498	Separation point on Y061	
Pin 1	Signal	
Pin 2	Earth	
X510 earth pin		
X572 earth pin		

Measuring points and signal values

Y060 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth

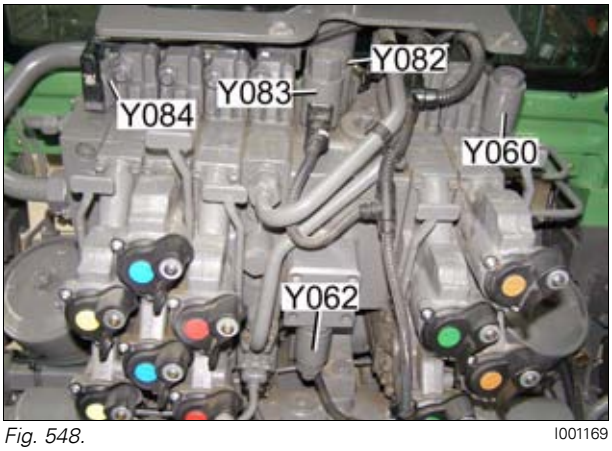


Fig. 548. I001169

Y061 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth

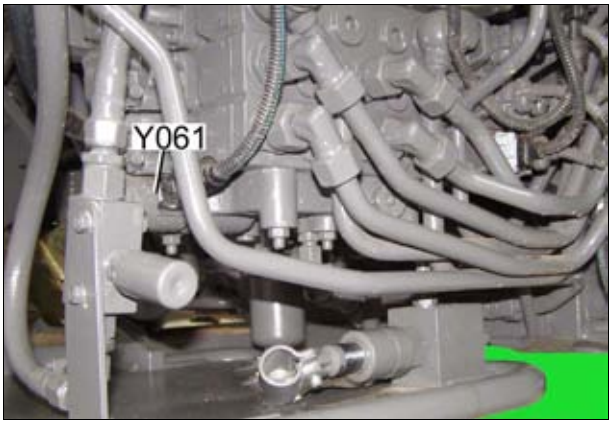


Fig. 549. I001176

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Connect adapter cable X899.980.246.201 directly to the component (plug adapter cable directly into the component).
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 9.4 ohms		
Earth	2			

Measuring the voltage (V)

Disconnect **B013** - Sensor, hydraulic oil temperature (X162 separation point)
Connect the X899.980.259.104 adapter cable and the X890.980.224.000 resistance decade to the wiring harness only

Activate hydraulic oil pre-heater:
Apply a resistance of approx. 7.4 Kohms (approx. - 5 °C)

Switch off hydraulic oil pre-heater:
Apply a resistance of approx. 1.7 Kohms (ca. 30 °C)

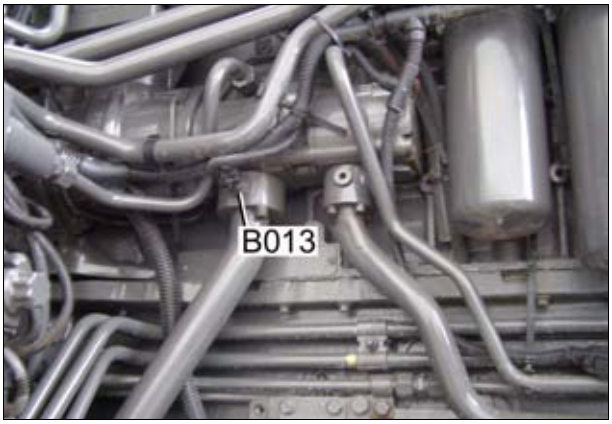


Fig. 550. I001061

NOTE: *Connect the X899.980.246.201 adapter cable directly to the component*
Start engine.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1			
		14 VDC	Switch position ON	
		0 VDC	Switch position OFF	
Earth	2			

Measuring power consumption (A)

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open pin 74 or 88 (X1403) and measure using a multimeter (ammeter).
Apply resistance at connector **B013** - Sensor, hydraulic oil temperature (see above)
Switch ignition on and start engine.

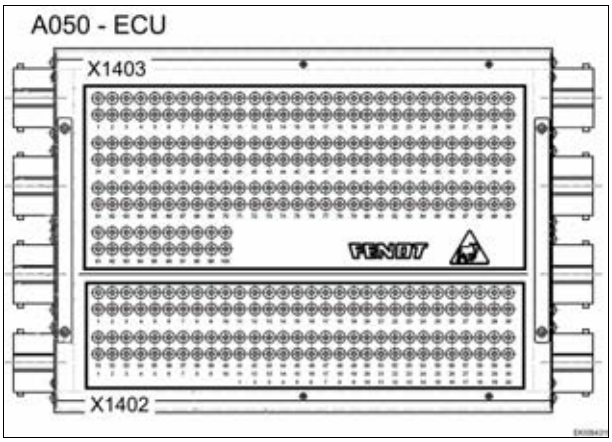


Fig. 551. I001874

***Y060** - Hydraulic oil pre-heater solenoid valve (rear)*

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	88			
		1.5 ADC	Switch position ON	
		0 ADC	Switch position OFF	

***Y061** - hydraulic oil pre-heater solenoid valve (middle)*

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	74			
		1.5 ADC	Switch position ON	
		0 ADC	Switch position OFF	

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Activation of **Y060** - Hydraulic oil pre-heater solenoid valve (rear)	88
Activation of **Y061** - hydraulic oil pre-heater solenoid valve (middle)	74
Activation of **Y012** - Oil pre-heater/load suspension solenoid valve	87
Earth	22

NOTE: *see §21*
see §34

141 Y062 solenoid valve, field pressure control (rear)

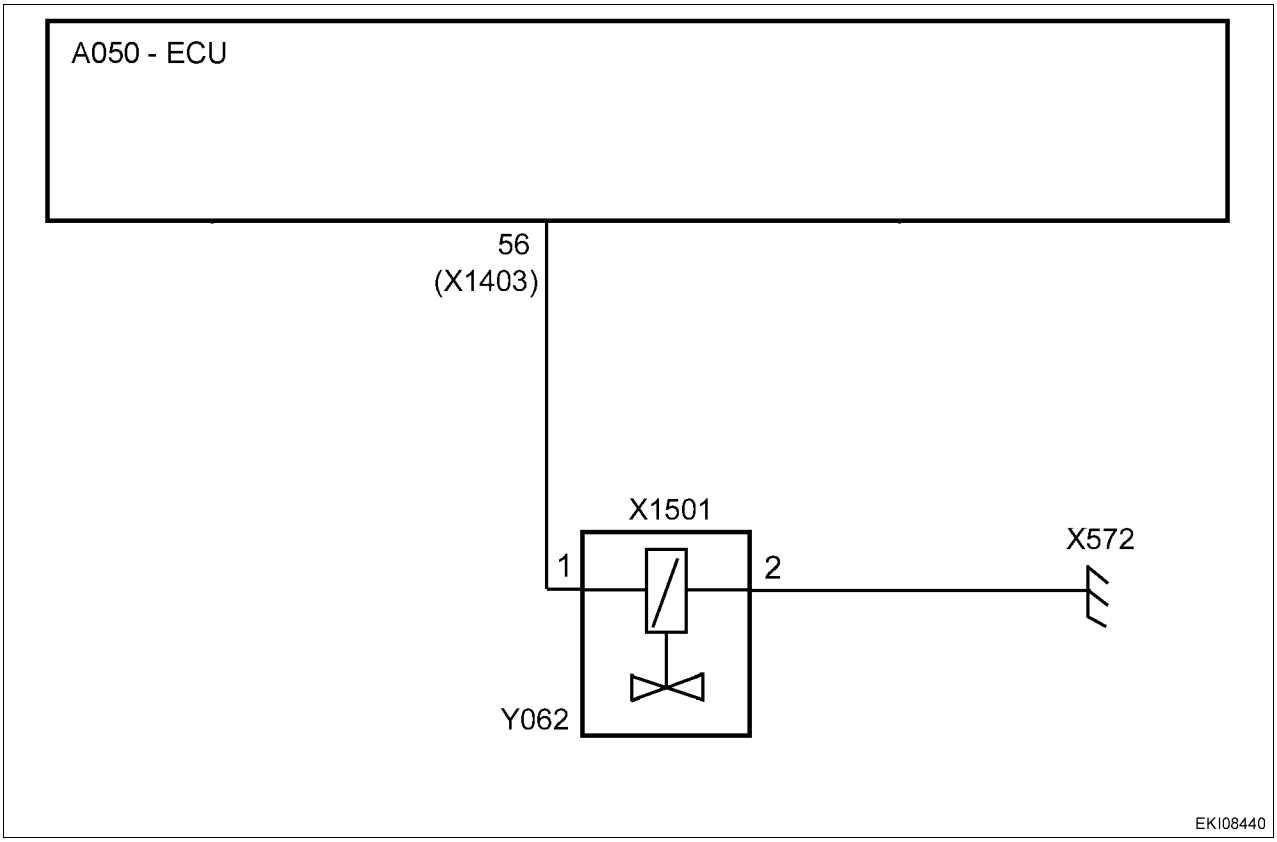


Fig. 552. I002074

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 56 (X1403)	Actuation of Y062	
Y062 - Solenoid valve, field pressure control (rear)		
X1501	Separation point on Y062	
Pin 1	Actuation	
Pin 2	Earth	
X572 earth pin		

NOTE: ***The field pressure of the implement is re-adjusted:***
– Approx. every 10 seconds
*- Following a movement on the **B030** - Sensor, rear power lift position*

Measuring points and signal values

Y062 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth

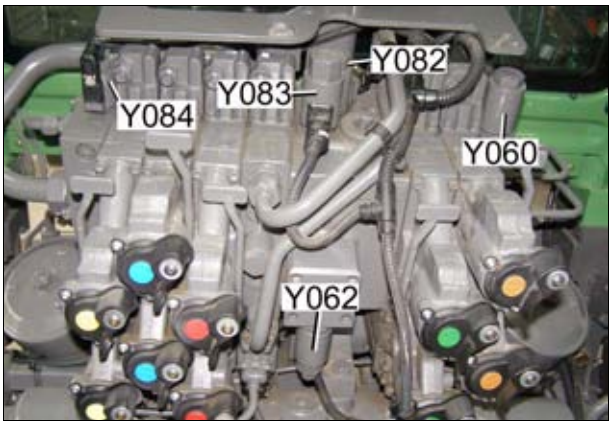


Fig. 553. I001169

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Connect adapter cable X899.980.246.201 directly to the component (plug adapter cable into the component only).
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 5.0 ohms	20 °C Coil resistance	
Earth	2			

Measuring the voltage (V)

NOTE: *Connect the X899.980.246.201 adapter cable directly to the component*
Start engine.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1			
		5.9 VDC	3 bar (minimum)	
		4.8 VDC	15 bar	
		4.5 VDC	30 bar	
		4.1 VDC	50 bar	
Earth	2			

Measuring power consumption (A)

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open pin 56 (X1403) and measure using a multimeter (ammeter).
Switch ignition on and start engine.

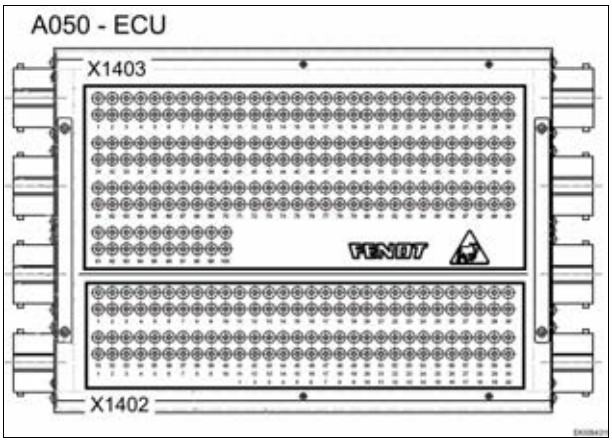


Fig. 554. I001874

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	56			
		1.10 ADC	3 bar (minimum)	
		0.90 ADC	15 bar	
		0.88 ADC	30 bar	
		0.80 ADC	50 bar	

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Activation of **Y062** - Solenoid valve, field pressure control (rear)	56
Earth	22

NOTE: *see §22*
see §34

In DA (double-acting) mode, the field pressure of the implement can be changed.
Call up second sub-menu of the rear EHR.

The field pressure can be changed in DA mode from **0 to 50 bar**.

Make adjustments:

- Rotate setting knob (B), until the desired position (C) is reached.
- Press setting knob (B)
- Display (C) changes from green to red
- Rotate setting knob (B), settings are changed and saved
- Press setting knob (B)
- Display (C) changes from red to green and jumps to the next setting option.

In DA mode, the maximum field pressure is limited to 50 bar.
It is not possible to jack up the tractor.

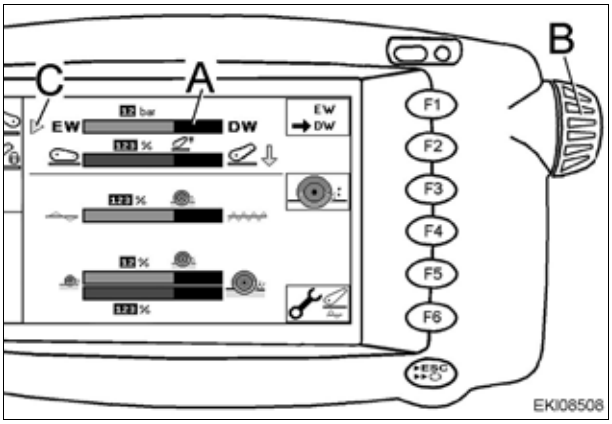


Fig. 555. I002075

142 Y063 wobble stabiliser solenoid valve

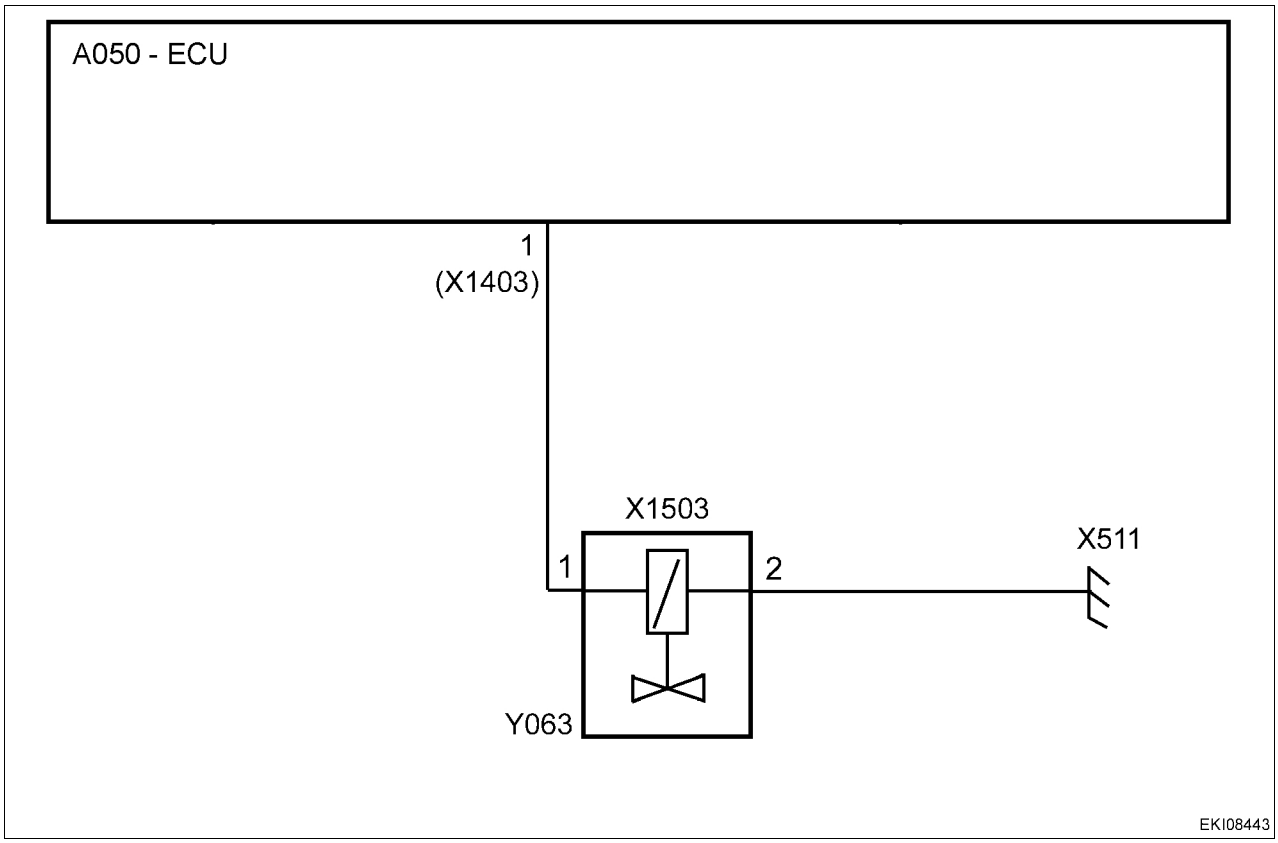


Fig. 556. I002077

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 1 (X1403)	Activation signal to Y063	
Y063 - Wobble stabiliser solenoid valve		
X1503	Separation point on Y063	
Pin 1	Actuation	
Pin 2	Earth	
X511 earth pin		

Measuring points and signal values

Y063 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth



Fig. 557. I001177

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Connect the X899.980.246.201 adapter cable directly to the component
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 4.6 ohms	20 °C Coil resistance	
Earth	2			

NOTE: *Connect adapter box X899.980.304.000 to **A050** - ECU, basic control unit and measure pins*
Accelerate the tractor to approx. 25 km/h from standstill
Maximum deviation between B066/B068 sensors, left/right wheel position =20 mm

DANGER: Where necessary:

- **Jack up all four wheels of the tractor**
- **Engage 4WD**

Measuring the voltage (V)

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1 (X1403)	0 VDC	Pull tractor away from station-ary, speed below 25 Km/h	
		14 VDC	Speed above 25 Km/h	
		0 VDC	speed below 15 Km/h	
Earth	22 (X1403)			

Measuring power consumption (A)

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open pin 1 (X1403) and measure using a multimeter (ammeter).
Switch ignition on and start engine.

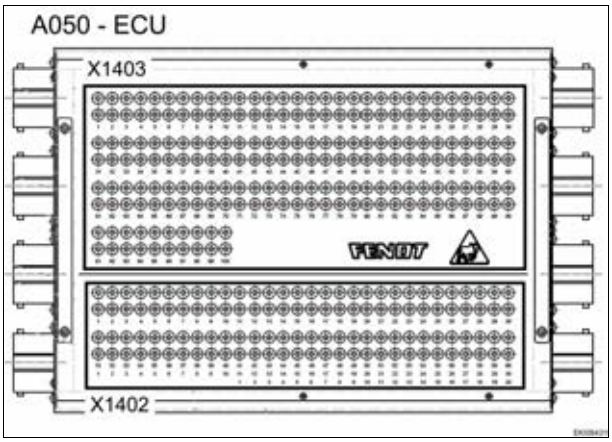


Fig. 558. I001874

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1 (X1403)	0 ADC	Pull tractor away from station-ary, speed below 25 Km/h	
		2.9 ADC	Speed above 25 Km/h	
		0 ADC	speed below 15 Km/h	

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Activation of **Y063** - Wobble stabiliser solenoid valve	1
Earth	22

NOTE: *see §27*
see §34
see §2

143 Y064 solenoid valve, suspension load pressure/lowering

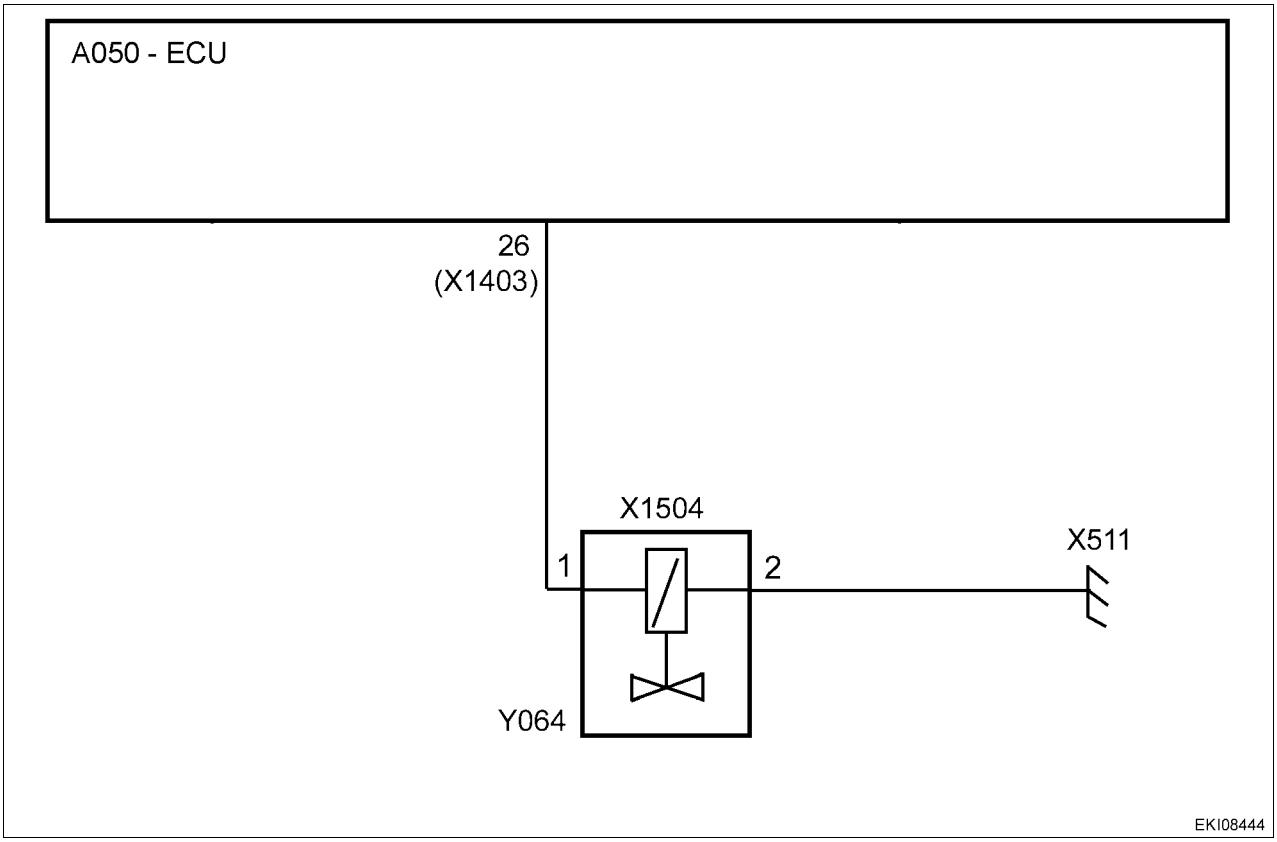


Fig. 559. I002078

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 26 (X1403)	Actuation of Y064	
Y064 - Suspension load pressure/lowering solenoid valve		
X1504	Separation point on Y064	
Pin 1	Actuation	
Pin 2	Earth	
X511 earth pin		

Measuring points and signal values

Y064 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth

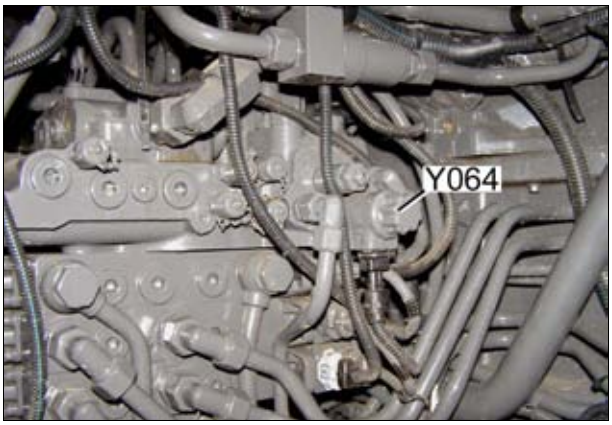


Fig. 560. I001165

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Connect the X899.980.246.201 adapter cable directly to the component
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 8 ohms	20 °C Coil resistance	
Earth	2			

NOTE: *When the front axle is lowered, the **Y064** - Suspension load pressure/lowering solenoid valve is fully energised. When the front axle is raised, the **Y064** - Suspension load pressure/lowering solenoid valve is energised until there is a counter pressure of 100 bar.*

WARNING: When the tractor is stationary, raising or lowering the tractor body is dangerous for people in the vicinity of the front axle.

Measuring the voltage (V)

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	0 VDC	Front axle not actuated	
		5.6 VDC	Front axle rising	
		6.1 VDC	Front axle lowering	
Earth	2			

Measuring power consumption (A)

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open pin 26 (X1403) and measure using a multimeter (ammeter).
Switch ignition on and start engine.

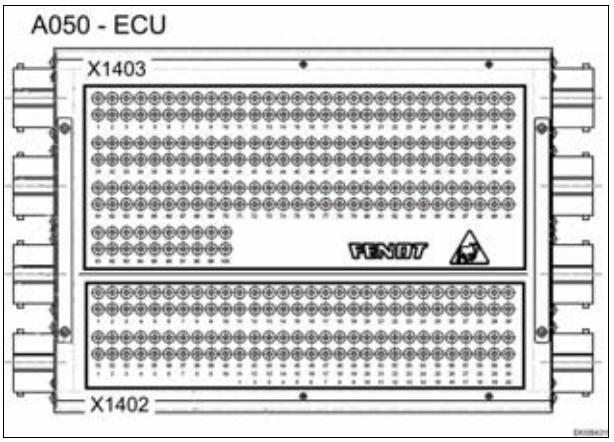


Fig. 561. I001874

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	26 (X1403)	0.0 ADC	Front axle not actuated	
		0.6 ADC	Front axle rising	
		0.8 ADC	Front axle lowering	

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Activation of **Y064** - Suspension load pressure/lowering solenoid valve	26
Earth	22

NOTE: *see §27*
see §34
see §2

144 Y065 raise suspension solenoid valve

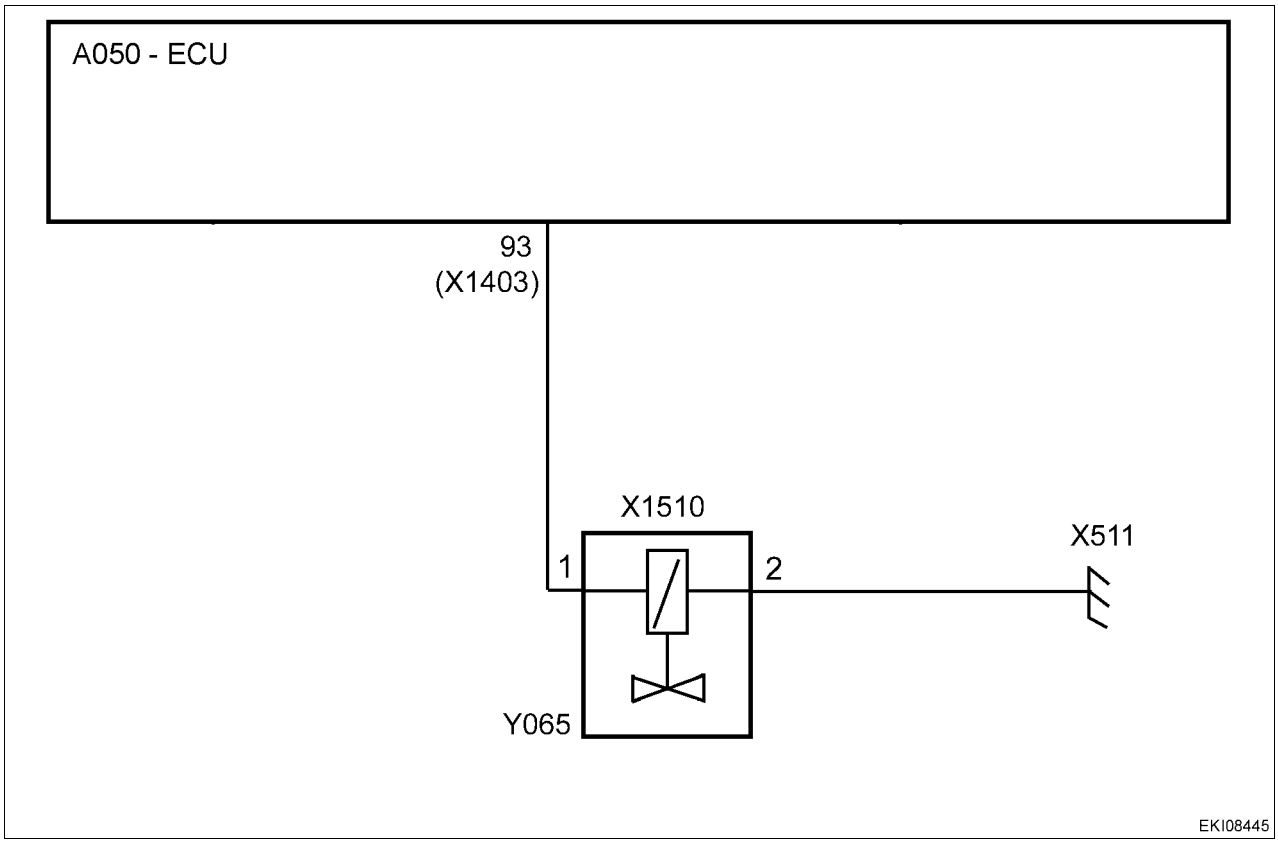


Fig. 562. I002079

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 93 (X1403)	Actuation of Y065	
Y065 - Raise suspension solenoid valve		
X1510	Separation point on Y065	
Pin 1	Actuation	
Pin 2	Earth	
X511 earth pin		

Measuring points and signal values

Y065 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth



Fig. 563. I001178

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Connect adapter cable X899.980.246.201 directly to the component (plug adapter cable into the component only).
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 8.0 ohms	20 °C Coil resistance	
Earth	2			

WARNING: When the tractor is stationary, raising or lowering the tractor body is dangerous for people in the vicinity of the front axle.

Measuring the voltage (V) (front axle unladen)

NOTE: *Connect the X899.980.246.201 adapter cable directly to the component*
Start engine.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	0 VDC	Front axle not actuated	
		14 VDC	Front axle rising	
		0 VDC	Front axle lowering	
Earth	2			

Measuring power consumption (A) (front axle unladen)

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open pin 93 (X1403) and measure using a multimeter (ammeter).
Switch ignition on and start engine.

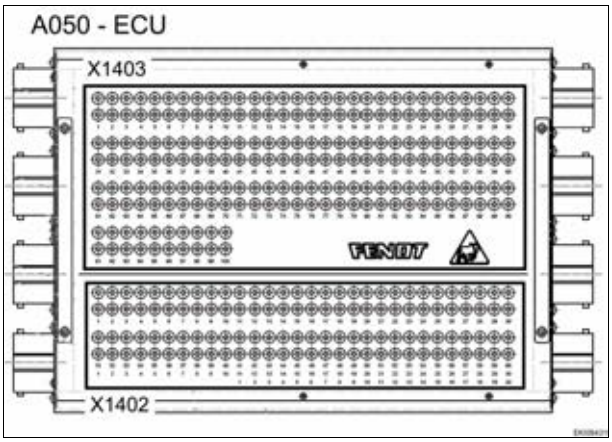


Fig. 564. I001874

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	93 (X1403)	0.0 ADC	Front axle not actuated	
		1.6 ADC	Front axle rising	
		0.0 ADC	Front axle lowering	

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Activation of **Y065** - Raise suspension solenoid valve	93
Earth	22

NOTE: *see §27*
see §34
see §2

145 Y067 lock suspension solenoid valve

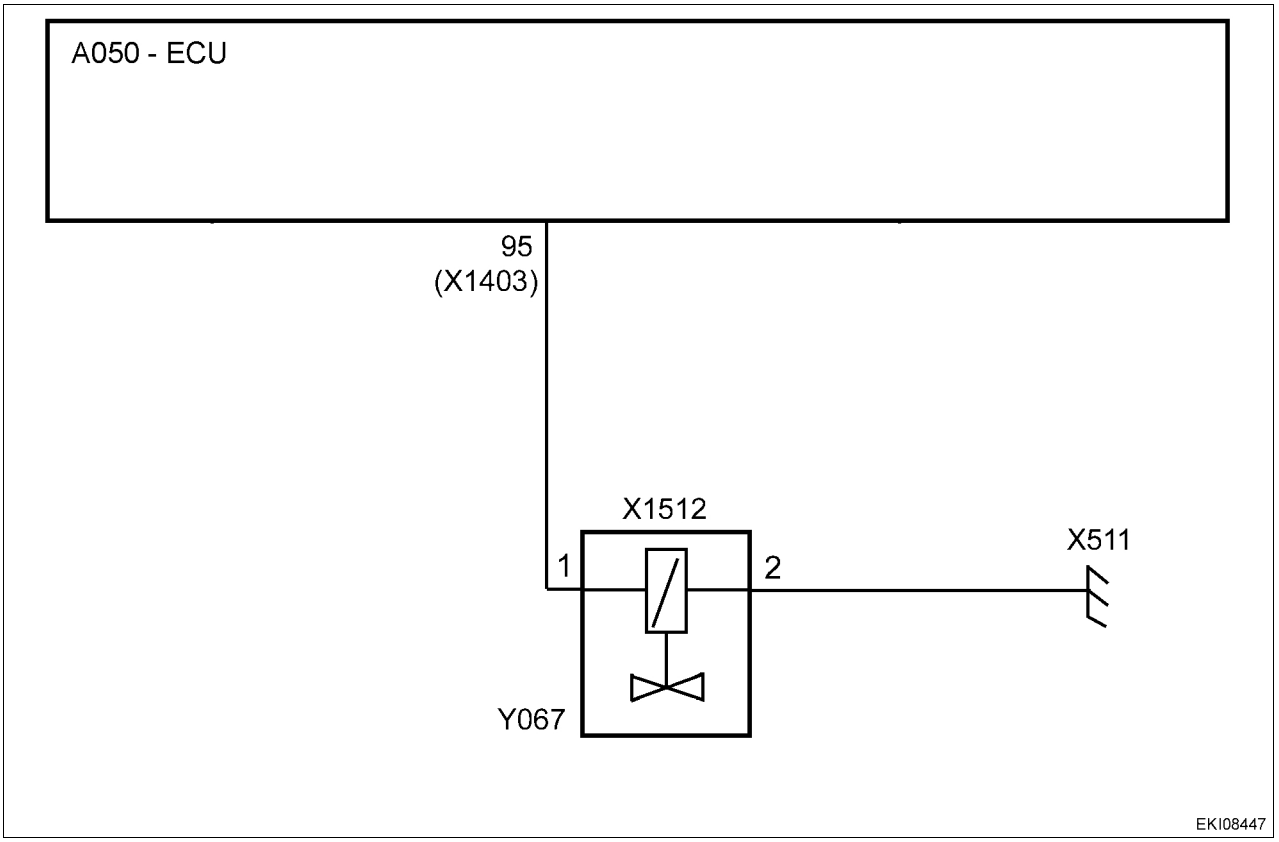


Fig. 565. I002081

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 95 (X1403)	Actuation of Y067	
Y067 - Lock suspension solenoid valve		
X1512	Separation point on Y067	
Pin 1	Actuation	
Pin 2	Earth	
X511 earth pin		

Measuring points and signal values

Y067 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth



Fig. 566. I001177

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Connect adapter cable X899.980.246.201 directly to the component (plug adapter cable into the component only).
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 4.5 ohms	20 °C Coil resistance	
Earth	2			

Measuring the voltage (V) (front axle unladen)

NOTE: *Connect the X899.980.246.201 adapter cable directly to the component*
Start engine.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	0 VDC	Front axle in "Suspension" mode	
		14 VDC	Front axle in "Locked" mode	
Earth	2			

Measuring power consumption (A) (front axle unladen)

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open pin 95 (X1403) and measure using a multimeter (ammeter).
Switch ignition on and start engine.

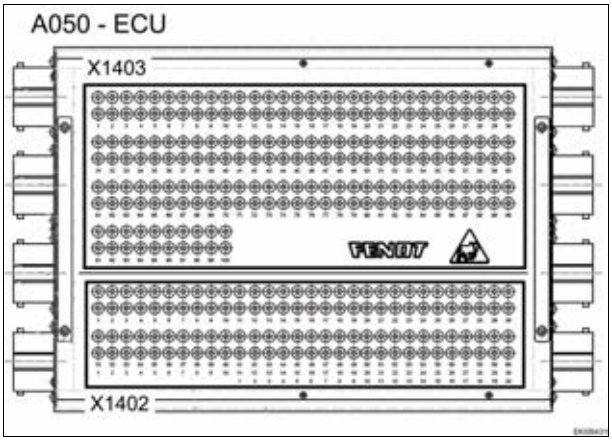


Fig. 567. I001874

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	95 (X1403)	0.0 ADC	Front axle in "Suspension" mode	
		2.7 ADC	Front axle in "Locked" mode	

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Activation of **Y067** - Lock suspension solenoid valve	95
Earth	22

NOTE: *see §27*
see §34
see §2

Measuring power consumption (A) and voltage (V)

Connect the X899.980.304.000 adapter box to the A050 ECU, basic control unit (see above).

Measuring voltage (V):
Measure pin 95 (on X1403) and **pin 22 (on X1403) "Earth"** using a multimeter (voltmeter).
Switch ignition on and start engine.
Lock front axle suspension; briefly press "Lock suspension" button (for less than 3 seconds).

Measuring power consumption (A):
Open pin 95 (on X1403) and measure using a multimeter (ampere meter).
Switch ignition on and start engine.
Lock front axle suspension; briefly press "Lock suspension" button (for less than 3 seconds).

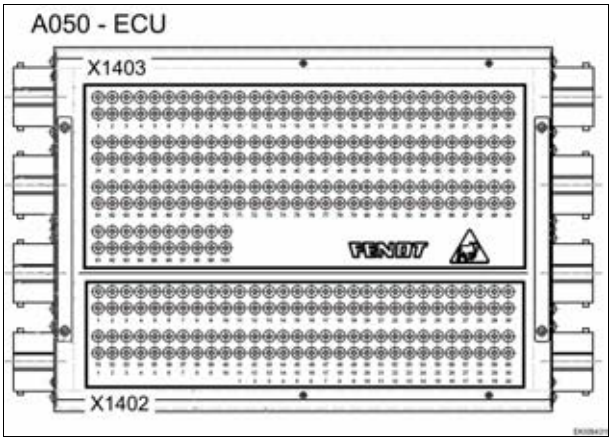


Fig. 568. I001874

Measuring the voltage (VDC)				
Note: Readings are for front axle suspension not under load.				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
Actuation	95 (on X1403)	0 VDC	Front axle suspension in "Suspension" mode	
		14 VDC	Front axle suspension in "Lock" mode	
Earth	22 (on X1403)			

Measuring the power consumption (ADC)				
Note: Readings are for front axle suspension not under load.				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
Actuation	95 (on X1403)	0 ADC	Front axle suspension in "Suspension" mode	
		2.7 ADC	Front axle suspension in "Lock" mode	

NOTE: *All readings +/- 10%.*

146 Y070 EPC cut-off valve (front power lift enhanced control)

Circuit diagram: Y070 EHR cut-off valve (front power lift enhanced control)

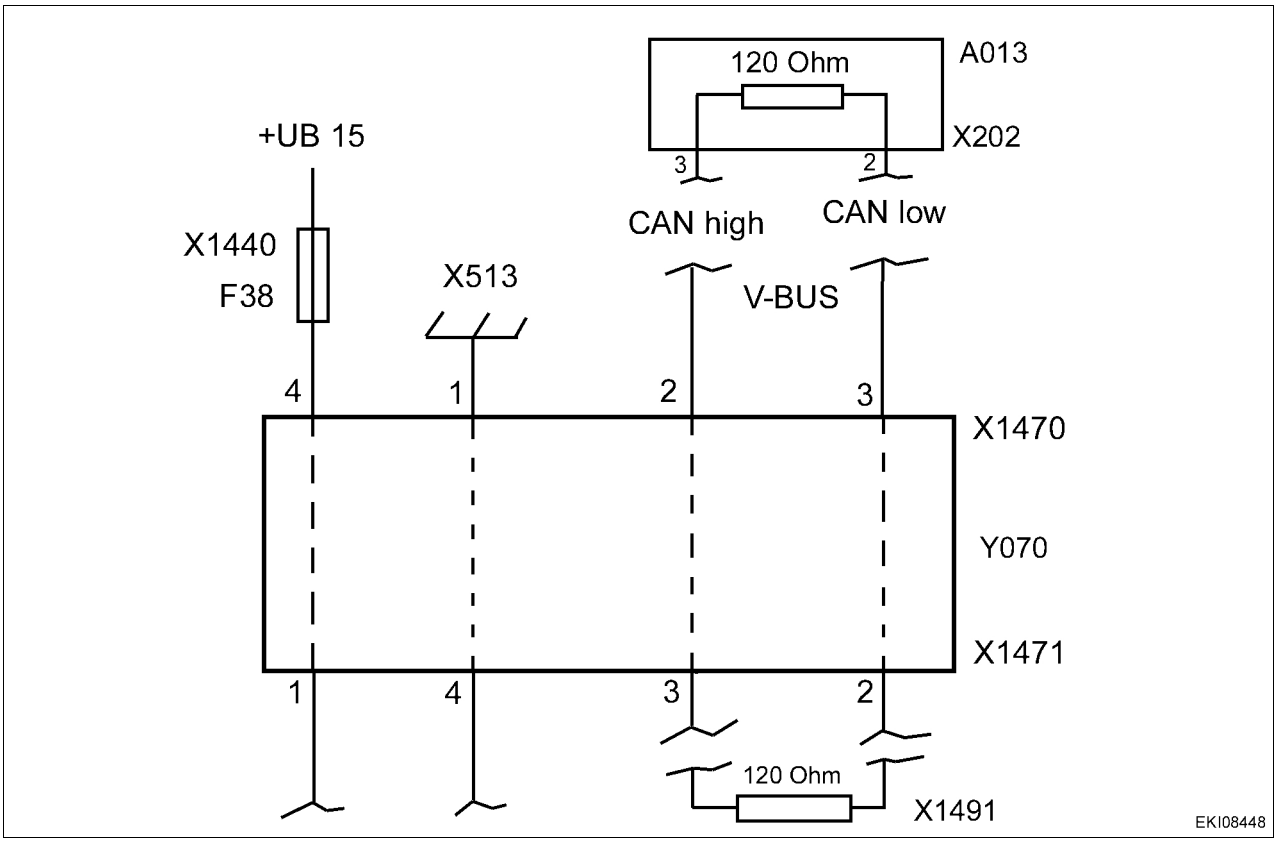


Fig. 569. I002089

Item	Designation	Note
A013 - PCB, microfuses	**(with BUS terminating resistance: 120 ohms)**	
X202	Separation point on A013	
Pin 2	Valve bus_Low	
Pin 3	Valve bus_High	
X513 earth pin		
X1440 fuse holder		
X1491 bus terminating connector (120 ohms)		
Y070 [FKH] - Cut-off valve, front power lift enhanced control		
X1470	Separation point on Y070	
X1471	Separation point on Y070	
V bus "Valve bus"		**Total resistance = 60 ohms (2 x 120 ohms connected in parallel)** **– X1491 bus terminating connector (120 ohms)** **– A013 PCB microfuse (120 ohms)**

Circuit diagram: valve bus "V bus"

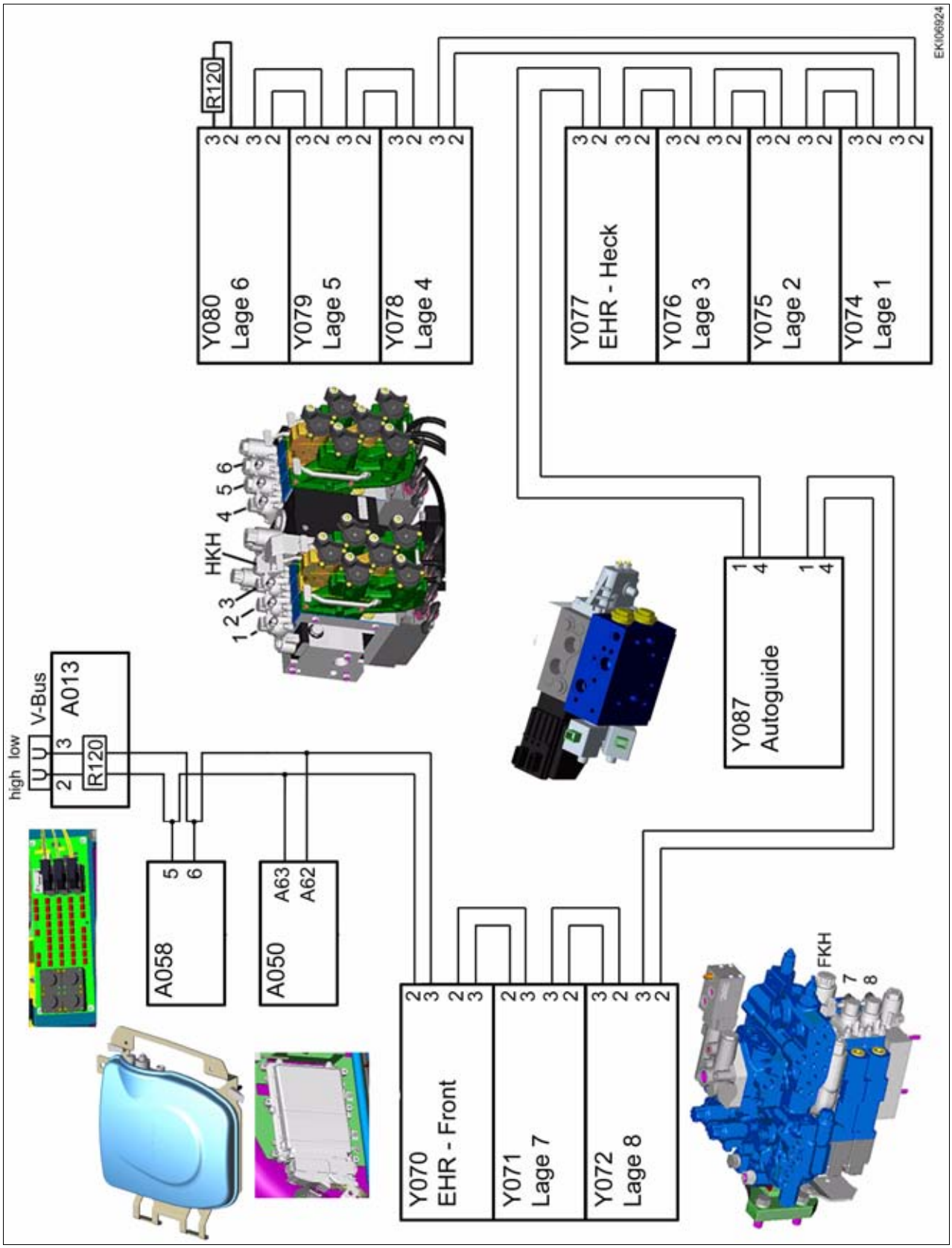


Fig. 570.

I004837

Measuring points and signal values

Y070 cut-off valve, input (black)	
Pin	**Function**
1	Earth
2	CAN high
3	CAN low
4	+ supply

Y070 cut-off valve, output (grey)	
Pin	**Function**
1	+ supply
2	CAN low
3	CAN high
4	Earth

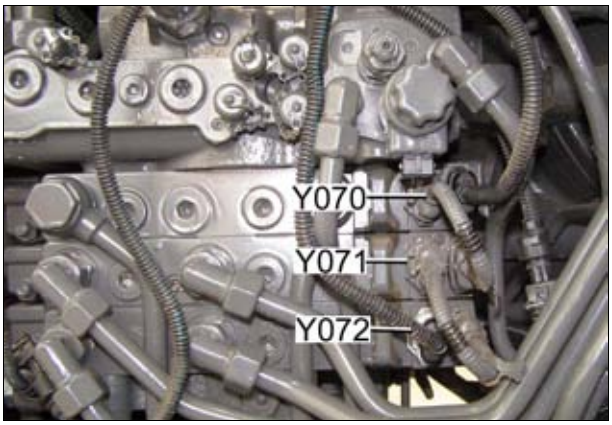


Fig. 571. I001179

Measure power supply

NOTE: *Connect X899.980.259.102 adapter cable to the valve input (black)*
Start engine.

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	4	14 VDC		Fuse (F38) or wiring set
Earth	1			

NOTE: *see §19*
see §20
see §25
see §34

Shutting down control valve:
The Y070 EHR cut-off valve is wired like an auxiliary control valve by the electr. connections.
If the Y070 EHR cut-off valve fails, it can be operated in emergency mode or shut down.

NOTE:

The control valves are connected like a daisy chain. This means that the valves are connected in series, i.e. one is connected to the other.
If one control valve has to be shut down, a valve is "skipped"

Diagram for valve shut down

If a valve has to be shut down, it is removed from the chain. If, for example, valve 2 has a problem and has to be shut down, valve 1 is connected to valve 3.

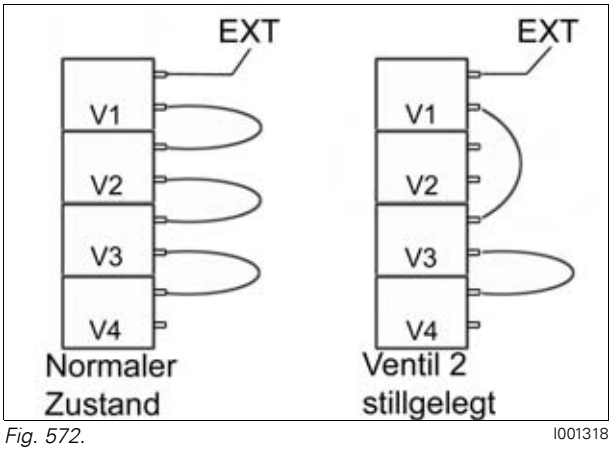


Fig. 572. I001318

147 Y071/Y072 auxiliary control valve, middle

Circuit diagram: Electr. Auxiliary control valve (Y)

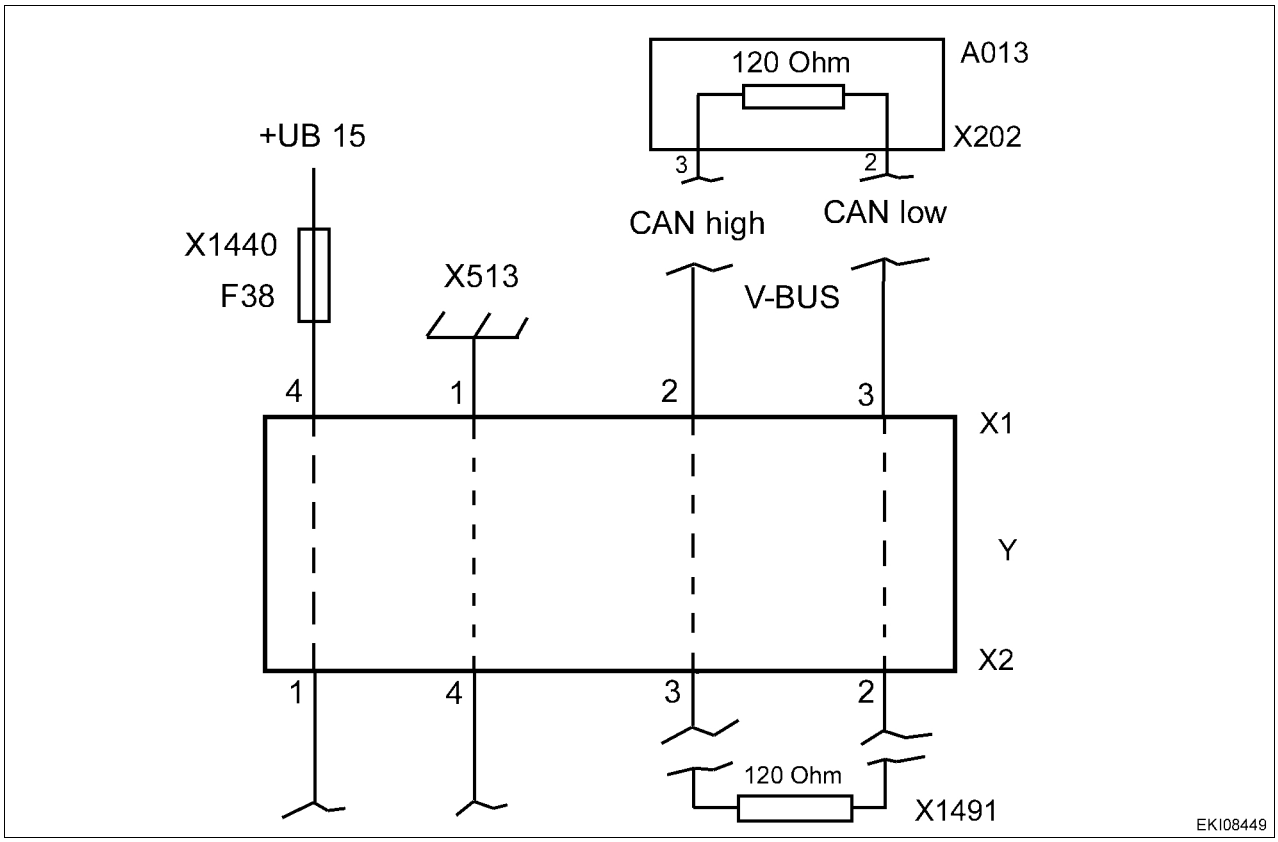


Fig. 573. I002094

Item	Designation	Note
A013 - PCB, microfuses **(with BUS terminating resistance: 120 ohms)**		
X202	Separation point on A013	
Pin 2	Valve bus_Low	
Pin 3	Valve bus_High	
X513 earth pin		
X1440 fuse holder		
X1491 bus terminating connector (120 ohms)		
Y - electr. Auxiliary control valve		
X1	Separation point on Y (input)	
X2	Separation point on Y (output)	
V bus "Valve bus"		**Total resistance = 60 ohms (2 x 120 ohms connected in parallel)** **– X1491 bus terminating connector (120 ohms)** **– A013 PCB, microfuse (120 ohms)**

Circuit diagram: valve bus "V bus"

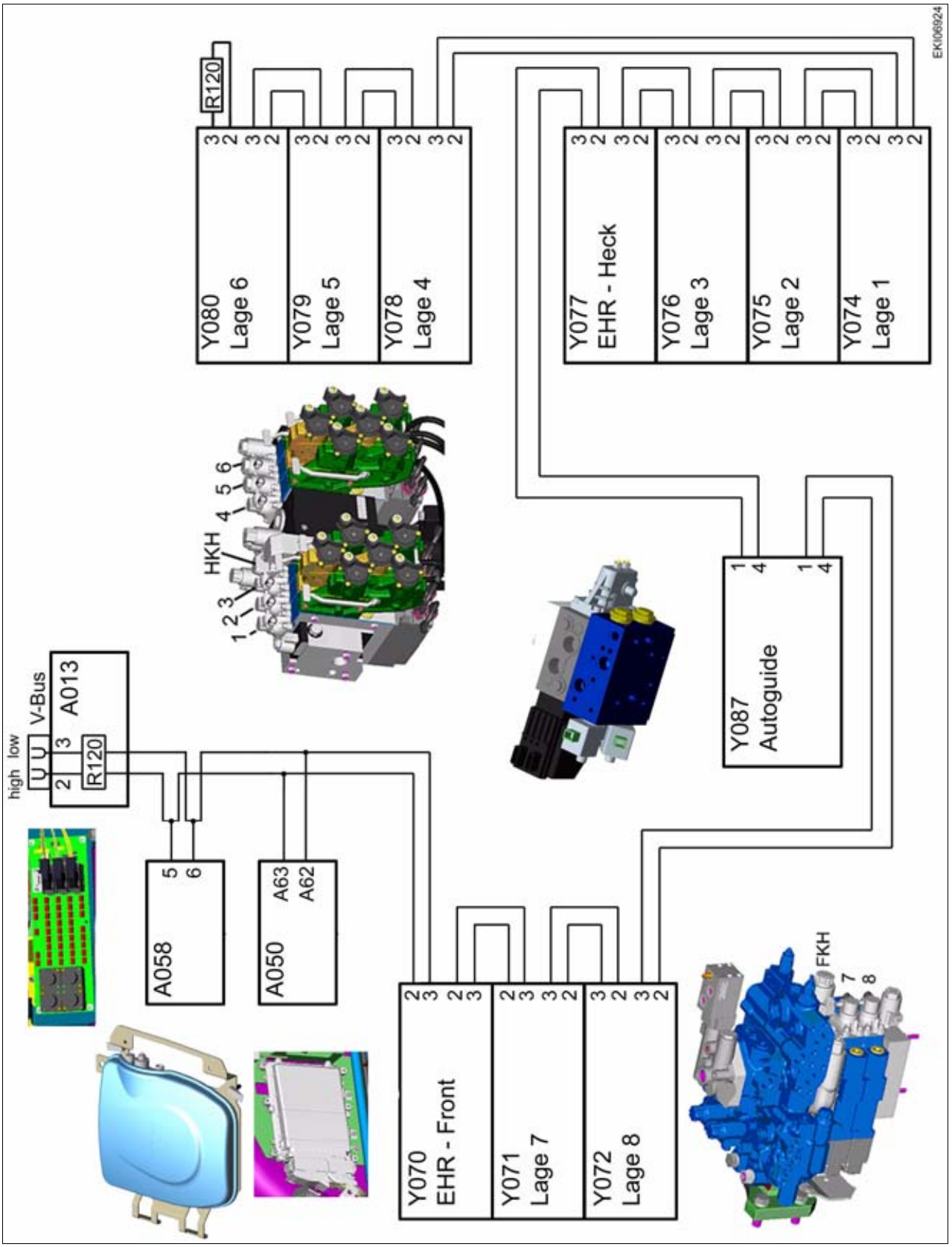


Fig. 574.

I004837

Measuring points and signal values

Y071/Y072 auxiliary control valve, input (black)	
Pin	**Function**
1	Earth
2	CAN high
3	CAN low
4	+ supply

Y071/Y072 auxiliary control valve, output (grey)	
Pin	**Function**
1	+ supply
2	CAN low
3	CAN high
4	Earth

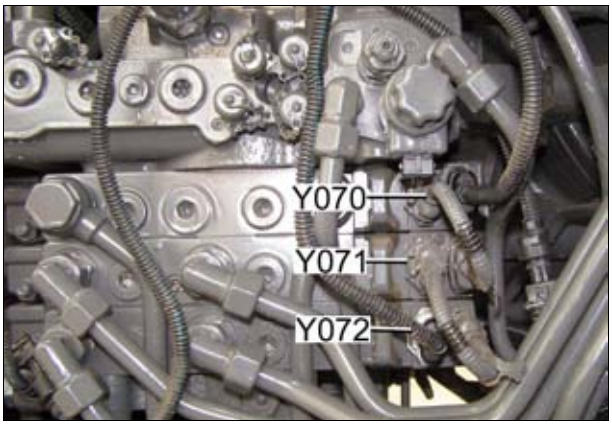


Fig. 575. I001179

Measure power supply

NOTE: *Connect X899.980.259.102 adapter cable to the valve input (black)*
Start engine.

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	4	14 VDC		Fuse (F38) or wiring set
Earth	1			

NOTE: *see §19*
see §20
see §23
see §34

Shutting down control valve:
In the event of an Y electrical auxiliary control valve failing, the Y electrical auxiliary control valve can be operated in emergency operation or also be shut down.

NOTE:

The control valves are connected like a daisy chain. This means that the valves are connected in series, i.e. one is connected to the other.
If one control valve has to be shut down, a valve is "skipped"

Diagram for valve shut down

If a valve has to be shut down, it is removed from the chain. If, for example, valve 2 has a problem and has to be shut down, valve 1 is connected to valve 3.

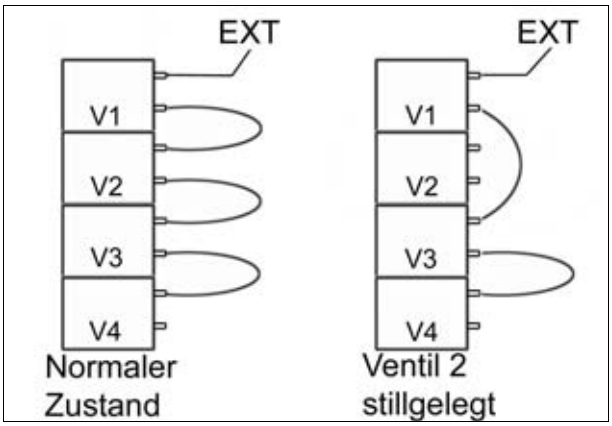


Fig. 576. I001318

148 Y074/Y075/Y076/Y078/Y079/Y080 rear auxiliary control valve

Circuit diagram: Electr. Auxiliary control valve (Y)

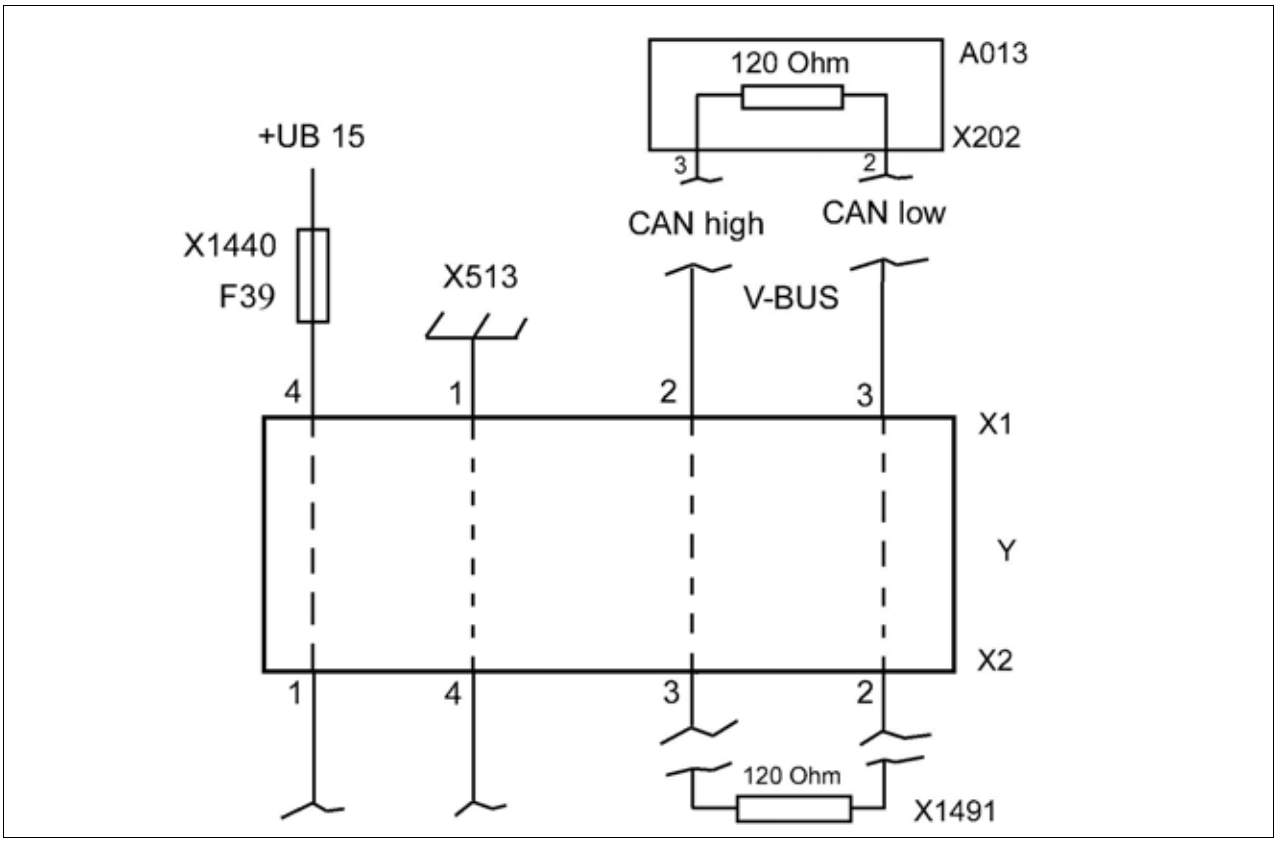


Fig. 577. I007756

Item	Designation	Note
A013 - PCB, microfuses **(with BUS terminating resistance: 120 ohms)**		
X202	Separation point on A013	
Pin 2	Valve bus_Low	
Pin 3	Valve bus_High	
X513 earth pin		
X1440 fuse holder		
X1491 bus terminating connector (120 ohms)		
Y - electr. Auxiliary control valve		
X1	Separation point on Y (input)	
X2	Separation point on Y (output)	
V bus "Valve bus"		**Total resistance = 60 ohms (2 x 120 ohms connected in parallel)** **– X1491 bus terminating connector (120 ohms)** **– A013 PCB, microfuse (120 ohms)**

Circuit diagram: valve bus "V bus"

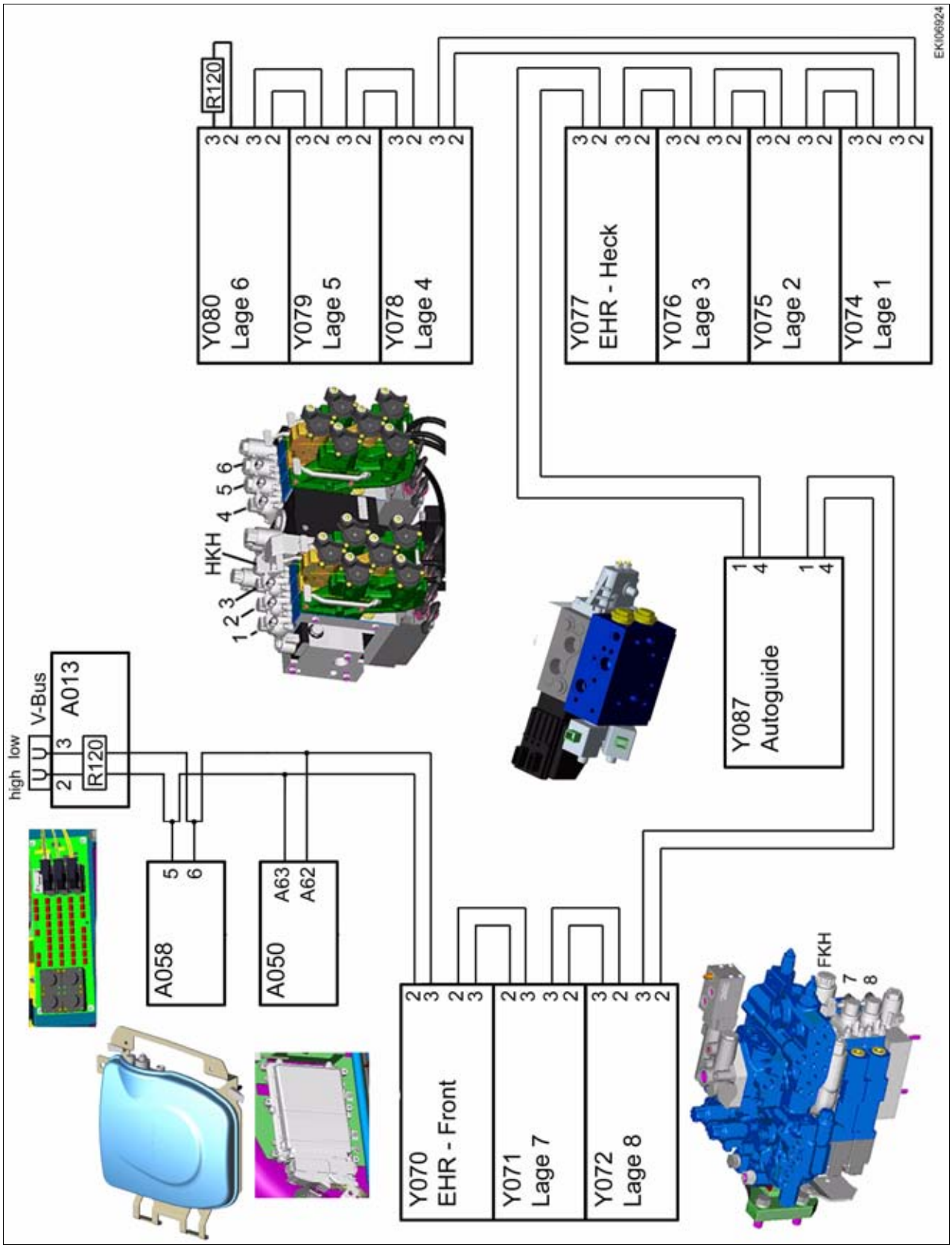


Fig. 578.

I004837

Measuring points and signal values

Auxiliary control valve, input (black)	
Pin	**Function**
1	Earth
2	CAN high
3	CAN low
4	+ supply

Auxiliary control valve, output (grey)	
Pin	**Function**
1	+ supply
2	CAN low
3	CAN high
4	Earth

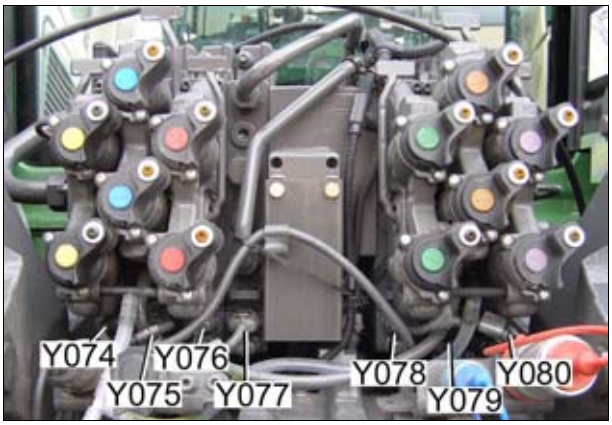


Fig. 579. I001180

Measure power supply

NOTE: *Connect X899.980.259.102 adapter cable to the valve input (black)*
Start engine.

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	4	14 VDC		Fuse (F39) or wiring set
Earth	1			

NOTE: *see §19*
see §20
see §23
see §34

Shutting down control valve:

In the event of an Y electrical auxiliary control valve failing, the Y electrical auxiliary control valve can be operated in emergency operation or also be shut down.

NOTE:

The control valves are connected like a daisy chain. This means that the valves are connected in series, i.e. one is connected to the other.
If one control valve has to be shut down, a valve is "skipped"

Diagram for valve shut down

If a valve has to be shut down, it is removed from the chain. If, for example, valve 2 has a problem and has to be shut down, valve 1 is connected to valve 3.

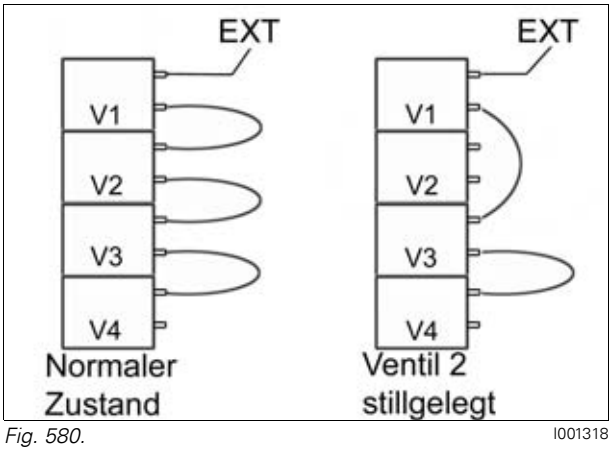


Fig. 580. I001318

149 Y077 EPC cut-off valve (rear power lift)

Circuit diagram: Y077 EHR cut-off valve (rear power lift)

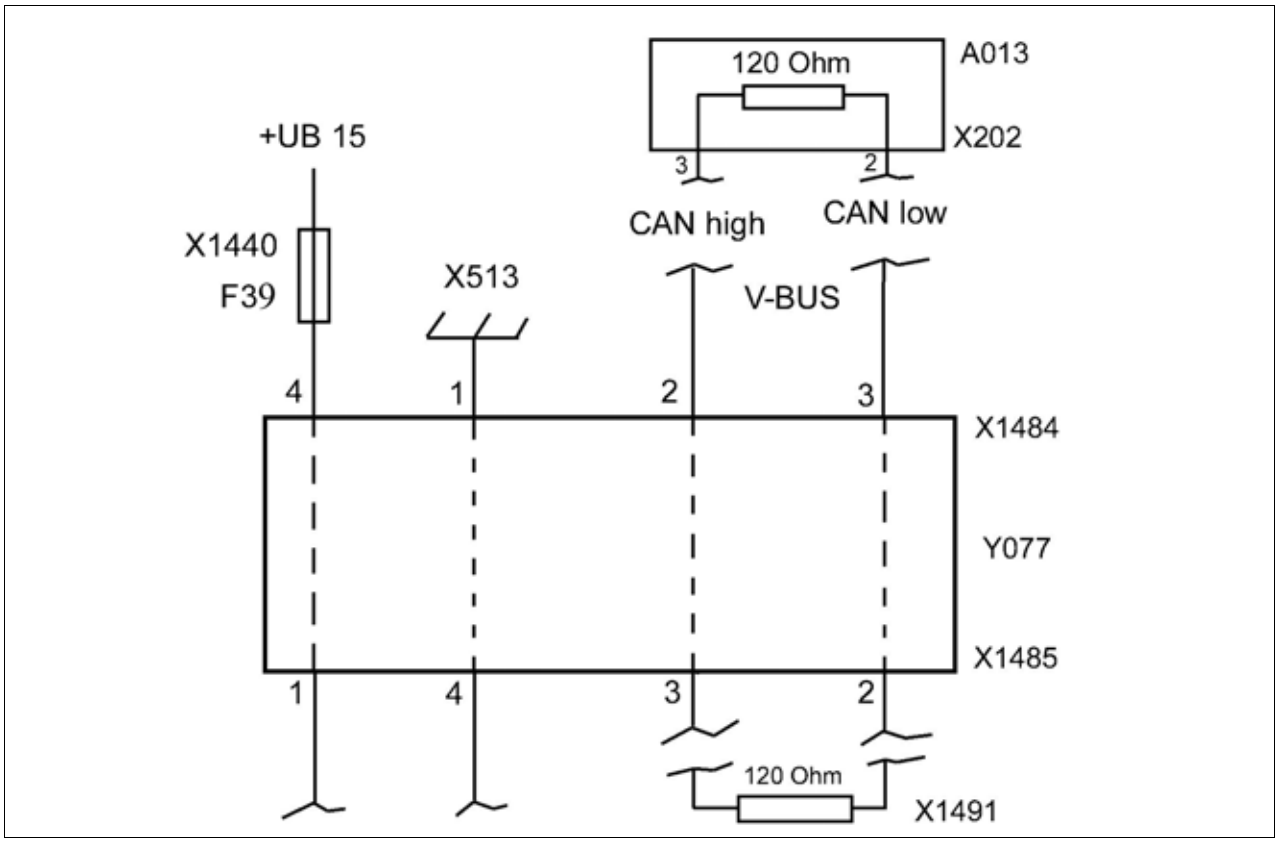


Fig. 581. I007757

Item	Designation	Note
A013 - PCB, microfuses	**(with BUS terminating resistance: 120 ohms)**	
X202	Separation point on A013	
Pin 2	Valve bus_Low	
Pin 3	Valve bus_High	
X513 earth pin		
X1440 fuse holder		
X1491 bus terminating connector (120 ohms)		
Y077 [HKH] - Cut-off valve, rear EPC		
X1484	Separation point on Y077	
X1485	Separation point on Y077	
V bus "Valve bus"		**Total resistance = 60 ohms (2 x 120 ohms connected in parallel)** **– X1491 bus terminating connector (120 ohms)** **- A013 PCB, microfuse**

Circuit diagram: valve bus "V bus"

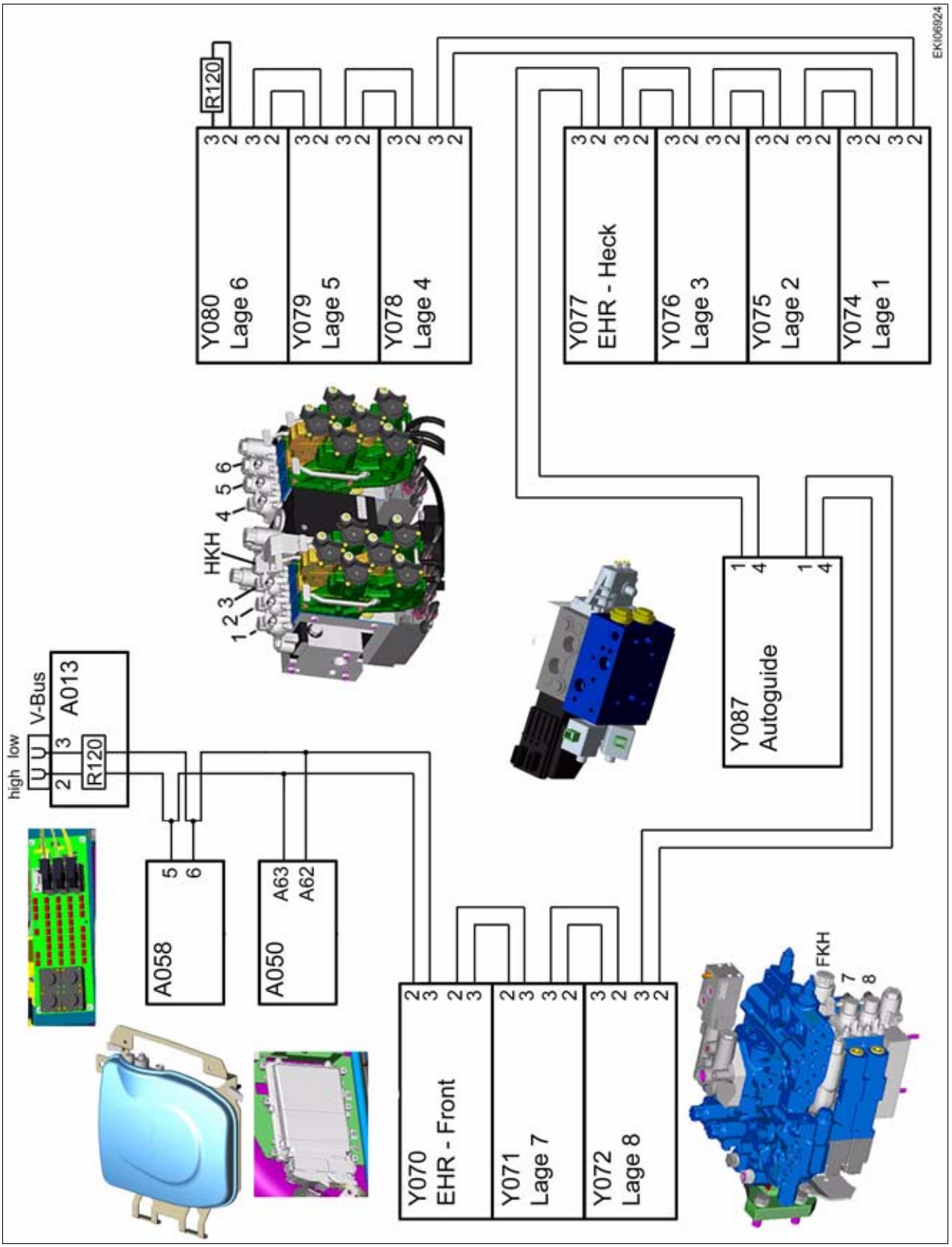


Fig. 582. I004837

Measuring points and signal values

Auxiliary control valve, input (black)	
Pin	**Function**
1	Earth
2	CAN high
3	CAN low
4	+ supply

Auxiliary control valve, output (grey)	
Pin	**Function**
1	+ supply
2	CAN low
3	CAN high
4	Earth

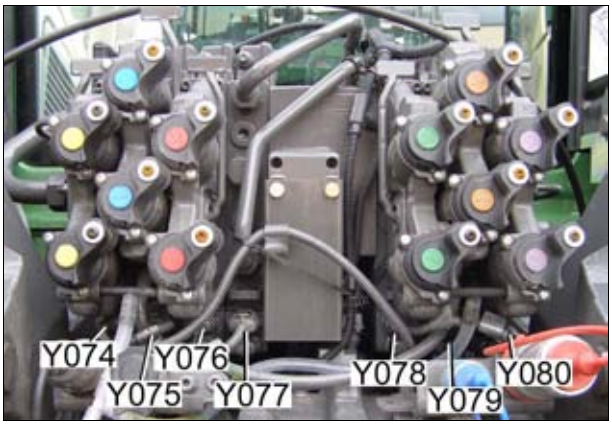


Fig. 583. I001180

Measure power supply

NOTE: *Connect X899.980.259.102 adapter cable to the valve input (black)*
Start engine.

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	4	14 VDC		Fuse (F39) or wiring set
Earth	1			

NOTE: *see §19*
see §20
see §22
see §34

Shutting down control valve:

The Y077 EHR cut-off valve is wired like an auxiliary control valve by the electr. connections.
If the Y077 EHR cut-off valve fails, it can be operated in emergency mode or shut down.

NOTE:

The control valves are connected like a daisy chain. This means that the valves are connected in series, i.e. one is connected to the other.
If one control valve has to be shut down, a valve is "skipped"

Diagram for valve shut down

If a valve has to be shut down, it is removed from the chain. If, for example, valve 2 has a problem and has to be shut down, valve 1 is connected to valve 3.

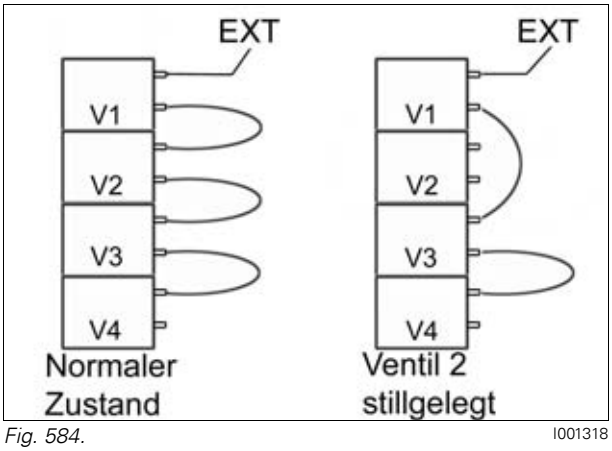


Fig. 584. I001318

150 Y082/Y083-Solenoid valve, lower link stabiliser, lock/release

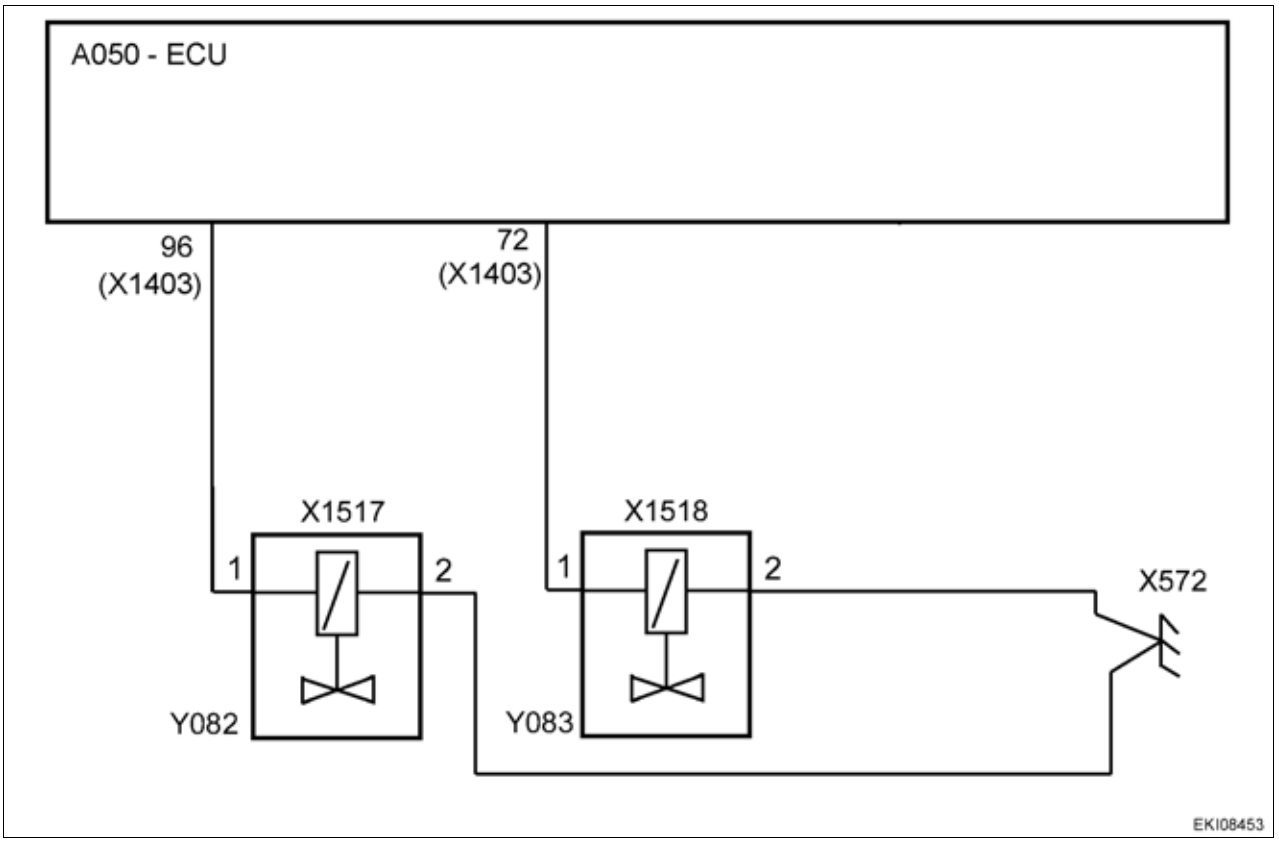


Fig. 585. I002111

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 96 (X1403)	Actuation of Y082 solenoid valve (MVUL)	
Pin 72 (X1403)	Actuation of Y083 solenoid valve (SVUL)	
Y082 - Solenoid valve, lower link stabiliser, lock		
X1517	Separation point on Y026	
Y083 - Solenoid valve, lower link stabiliser, release		
X1518	Separation point on Y027	
Pin 1	Signal	
Pin 2	Earth	
X572 earth pin		

Measuring points and signal values

Y082/Y083 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth

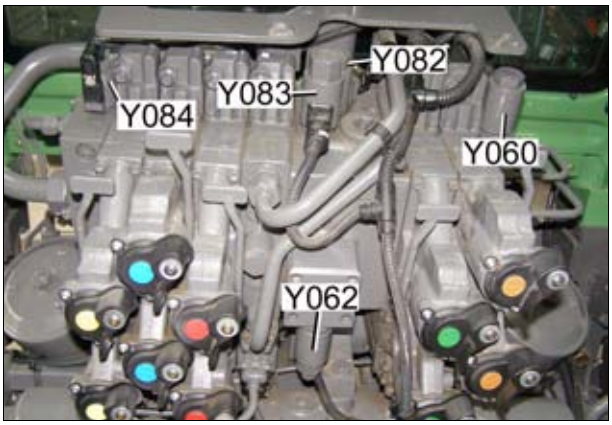


Fig. 586. I001169

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Connect adapter cable X899.980.246.201 directly to the component (plug adapter cable into the component only).
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 8.3 ohms		
Earth	2			

Measuring the voltage (V)

NOTE: *Connect the X899.980.246.201 adapter cable directly to the component*
Start engine.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1			
		14 VDC	Switch position ON	
		0 VDC	Switch position OFF	
Earth	2			

Measuring power consumption (A)

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open pin 96 or 72 (X1403) and measure using a multimeter (ammeter).
Switch ignition on and start engine.

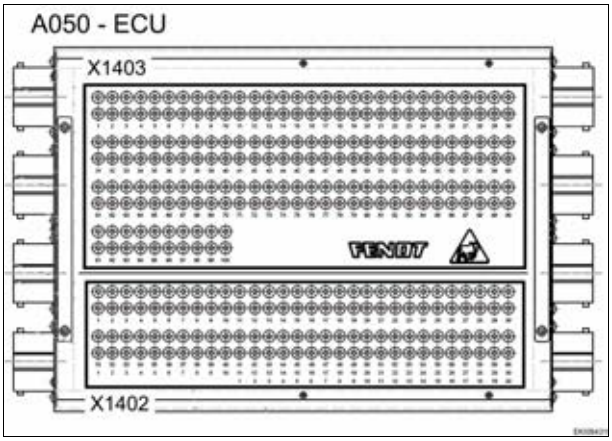


Fig. 587. I001874

Y082 *- Solenoid valve, lower link stabiliser, lock*

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	96			
		1.7 ADC	Lower link stabiliser locked **Note:** The Y082 solenoid valve is energised for approx. 5 seconds when it is locked.	
		0 ADC	Lower link stabiliser unlocked	

Y083 *- Solenoid valve, lower link stabiliser, release*

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	72			
		1.7 ADC	Lower link stabiliser unlocked **Note:** The Y083 solenoid valve is energised for approx. 5 seconds when it is unlocked.	
		0 ADC	Lower link stabiliser locked	

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Activation of **Y082** - Solenoid valve, lower link stabiliser, lock	96
Activation of **Y083** - Solenoid valve, lower link stabiliser, release	72
Earth	22

NOTE: *see §22*
see §34
see §3

151 Y084 control pressure increase solenoid valve

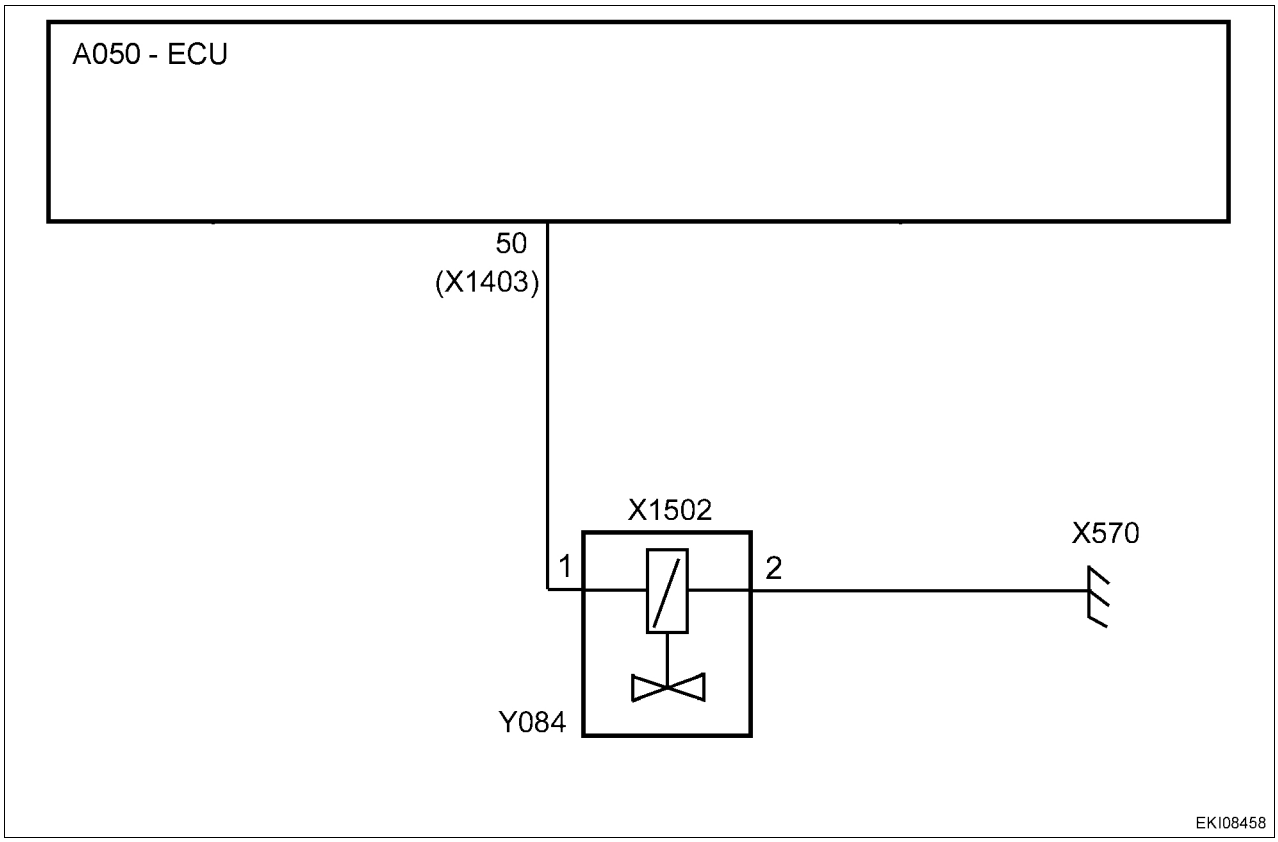


Fig. 588. I002114

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 50 (X1403)	Actuation of Y084	
Y084 - Solenoid valve, Power Beyond		
X1502	Separation point on Y084	
Pin 1	Actuation	
Pin 2	Earth	
X570 earth pin		

Measuring points and signal values

Y084 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth

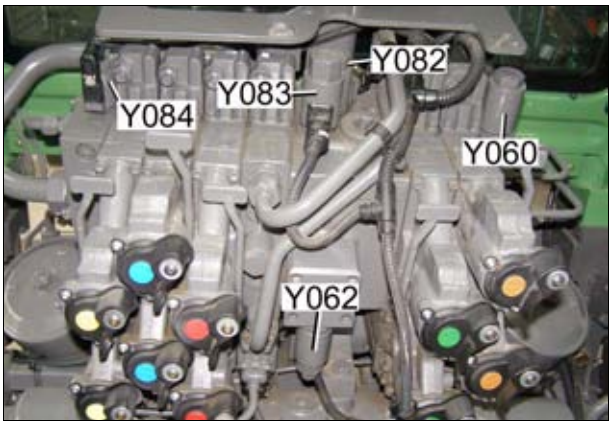


Fig. 589. I001169

Measuring the voltage (V)

NOTE: *Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.*

*Measure **pin 50 (X1403) and 22 (X1403)** using a multimeter (voltmeter)*
Switch ignition on and start engine.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	50			
		2.3 VDC	1 bar (minimum)	
		4.9 VDC	15 bar	
		6.9 VDC	25 bar	
Earth	22			

Measuring power consumption (A)

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open pin 50 (X1403) and measure using a multimeter (ammeter).
Switch ignition on and start engine.

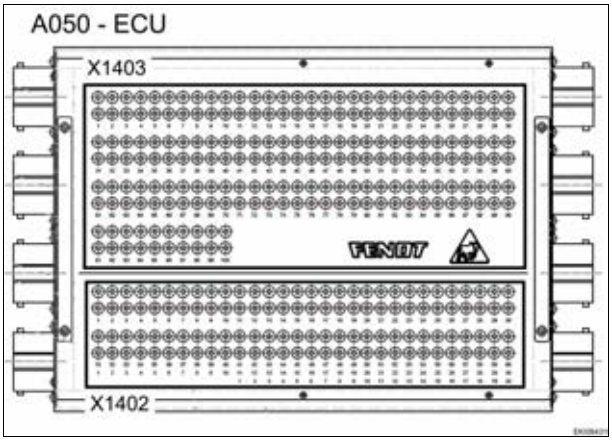


Fig. 590. I001874

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	50			
		0.4 ADC	1 bar (minimum)	
		0.8 ADC	15 bar	
		1.1 ADC	25 bar	

NOTE: *Default programming is 15 bar*

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Activation of **Y084** - Solenoid valve, Power Beyond	50
Earth	22

NOTE: *see §21*
see §34

152 Y085 solenoid valve, pilot pressure/switch-off (Auto-Guide)

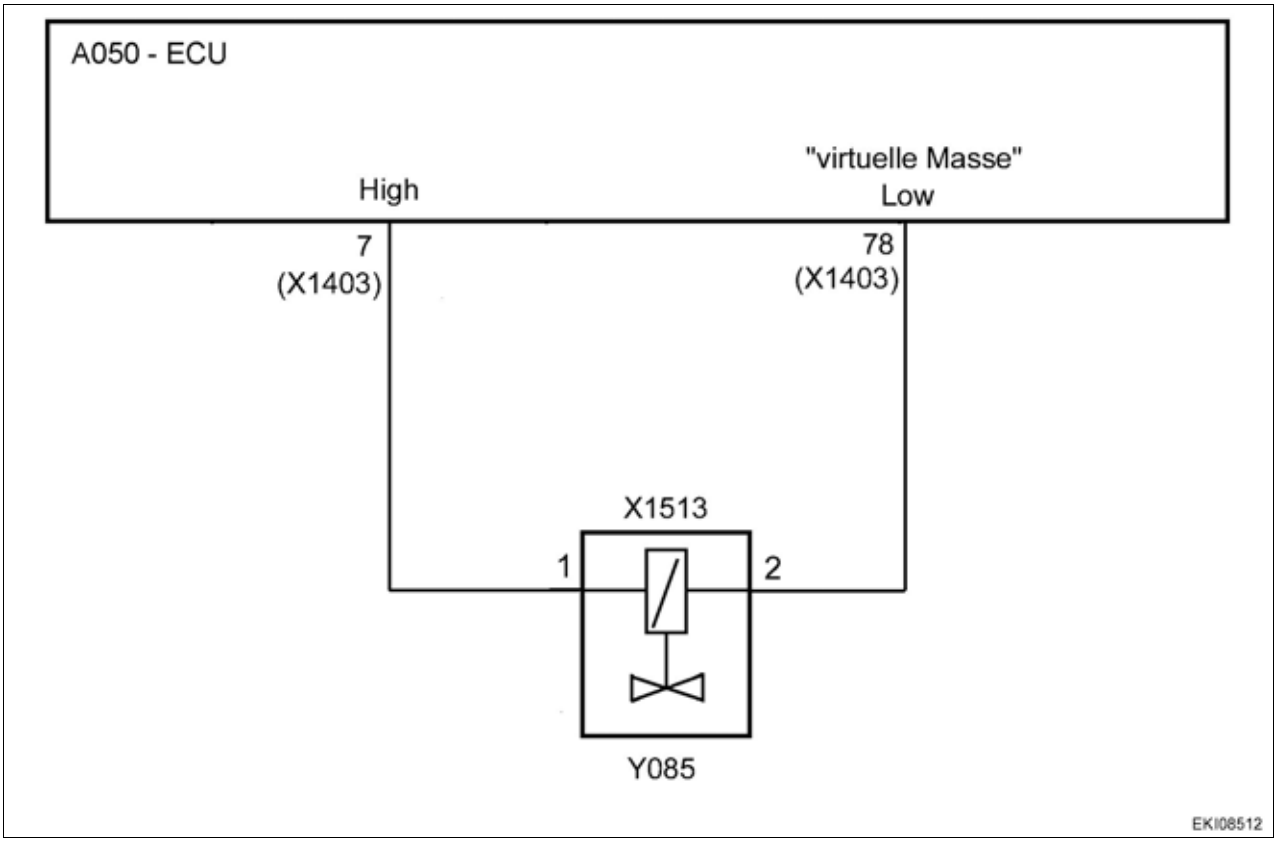


Fig. 591. I002164

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on **A050** - ECU, basic control unit	
Pin 7 (X1403)	Actuation (high) of Y085	
Pin 78 (X1403)	Actuation (low) of Y085 "virtual earth"	
Y085 - Pilot pressure/switch-off solenoid valve (Auto-Guide) **Note: Control pressure for the Y087 - Steering valve block, Auto-Guide is switched off (See also: Chapter 9600 Reg.C – Hydraulic circuit diagram).**		
X1513	Separation point on Y085	
Pin 1	Actuation (high)	
Pin 2	Actuation (low) "virtual earth"	

Measuring points and signal values

Y085 solenoid valve	
Pin	**Function**
1	Actuation (high)
2	Actuation (low) "virtual earth"

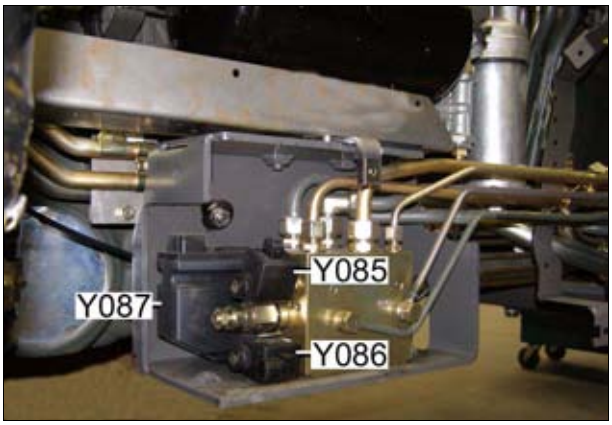


Fig. 592. I001987

Measuring resistance (ohms)

NOTE: *Switch off ignition*
Connect adapter cable X899.980.246.201 directly to the component (plug adapter cable into the component only).
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 7.6 ohms	20 °C Coil resistance	
Actuation	2			

Measuring the voltage (V)

NOTE: *Connect the X899.980.246.201 adapter cable directly to the component*
Start engine.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation (high)	1			
		14 VDC	Switch position ON	
		0 VDC	Switch position OFF	
Actuation (low)	2			

Measuring power consumption (A)

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open pin 7 (X1403) and measure using a multimeter (ammeter).
Switch ignition on and start engine.

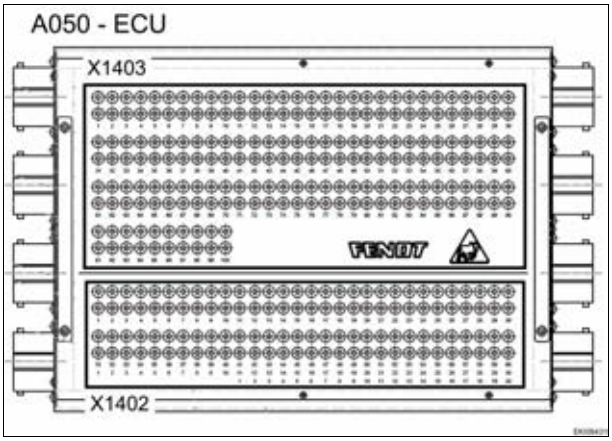


Fig. 593. I001874

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	7			
		1.6 ADC	Switch position ON	
		0.0 ADC	Switch position OFF	

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Actuation (high) of Y085	7
Actuation (low) of Y085	78

NOTE: *see §33*
see §34
see §1

K **"Autoguide" automatic track guide standby mode**

J **"Autoguide" automatic track guide ON/OFF**

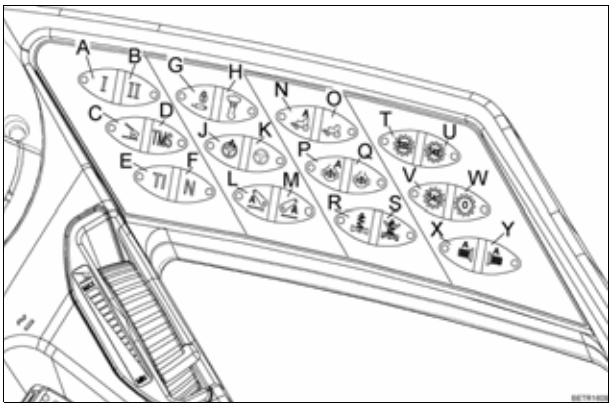


Fig. 594. I001157

153 Y086 solenoid valve, steering disconnect (Auto-Guide)

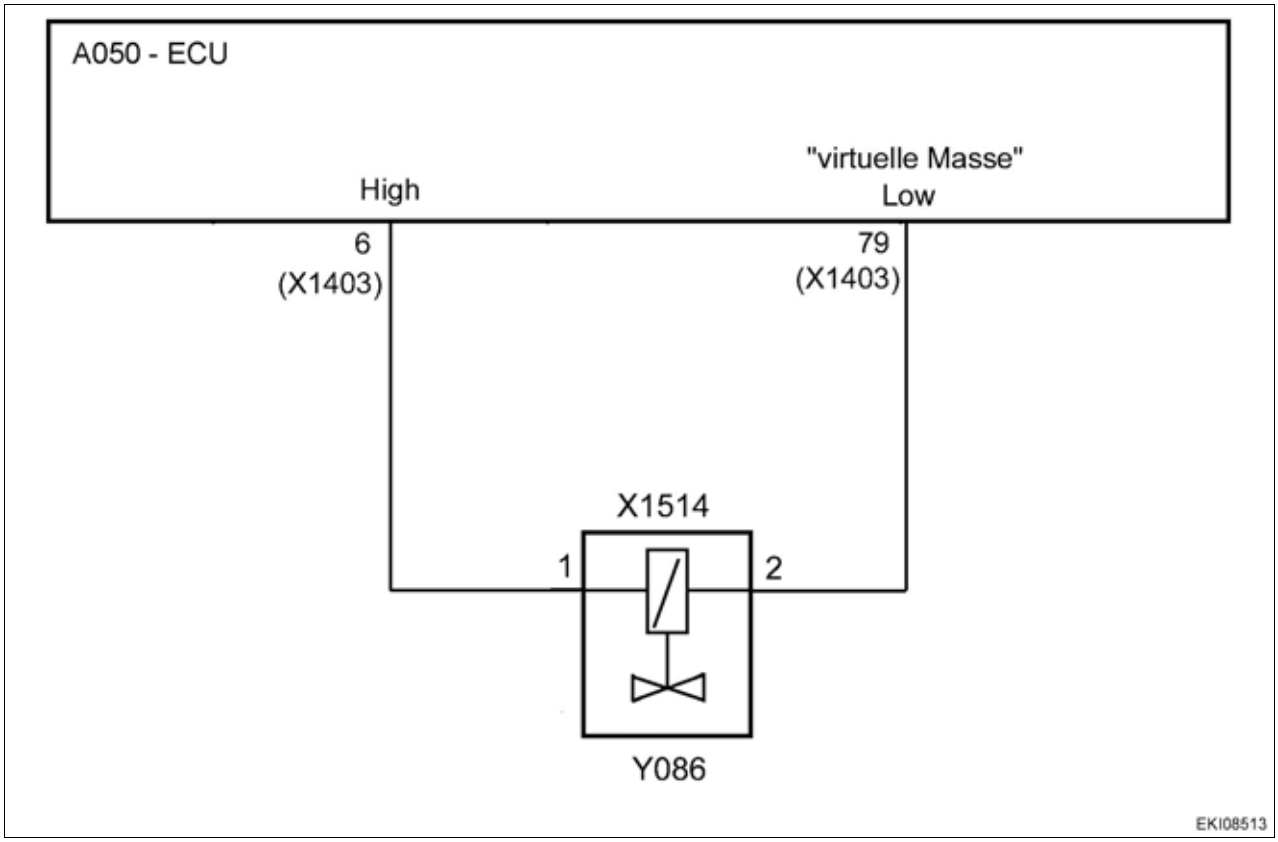


Fig. 595. I002184

Item	Designation	Note
A050 - ECU, basic control unit		
X1403	Separation point on the A050 ECU, basic control unit	
Pin 6 (X1403)	Actuation (high) of Y086	
Pin 79 (X1403)	Actuation (low) of Y086 "virtual earth"	
Y086 - Solenoid valve, steering disconnect (Auto-Guide) **Note:** The Y086 solenoid valve disconnects the **Y087** - Steering valve block, Auto-Guide from the LE steering servo unit.		
X1514	Separation point on Y086	
Pin 1	Actuation (high)	
Pin 2	Actuation (low) "virtual earth"	

Measuring points and signal values

Y086 solenoid valve	
Pin	**Function**
1	Actuation (high)
2	Actuation (low) "virtual earth"

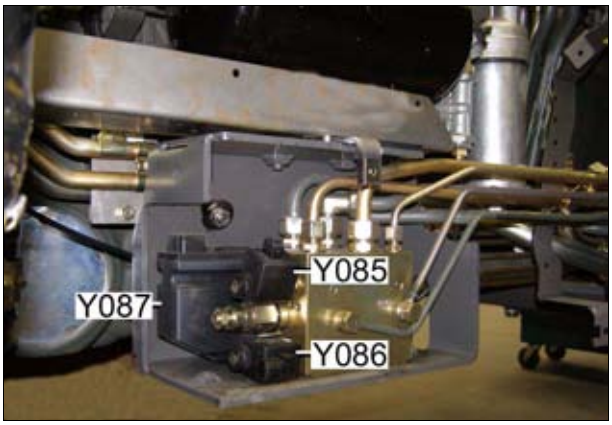


Fig. 596. I001987

Measuring resistance (ohms)

NOTE: *Switch off ignition*
Connect adapter cable X899.980.246.201 directly to the component (plug adapter cable into the component only).
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 7.6 ohms	20 °C Coil resistance	
Actuation	2			

Measuring the voltage (V)

NOTE: *Connect the X899.980.246.201 adapter cable directly to the component*
Start engine.
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation (high)	1			
		14 VDC	Switch position ON	
		0 VDC	Switch position OFF	
Actuation (low)	2			

Measuring power consumption (A)

Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.

Open pin 6 (X1403) and measure using a multimeter (ammeter).
Switch ignition on and start engine.

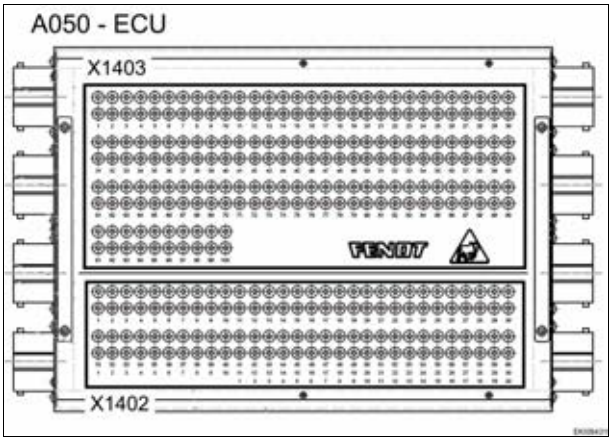


Fig. 597. I001874

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	6			
		1.6 ADC	Switch position ON	
		0.0 ADC	Switch position OFF	

Measuring point on the A050 - ECU, basic control unit (X1403 separation point)	
Function	**Pin**
Actuation (high) of Y086	6
Actuation (low) of Y086	79

NOTE: *see §33*
see §34
see §1

K **"Autoguide" automatic track guide standby mode**

J **"Autoguide" automatic track guide ON/OFF**

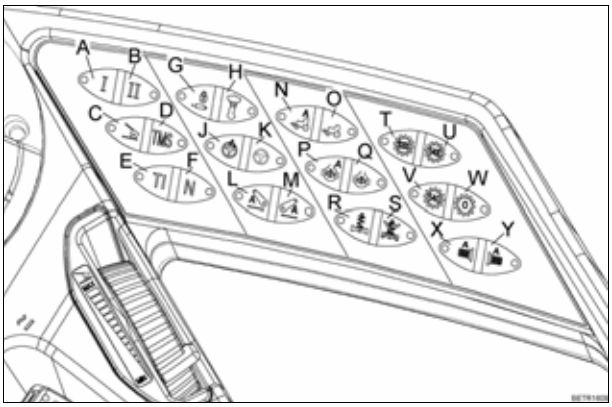


Fig. 598. I001157

154 Y087 steering valve block, Auto-Guide

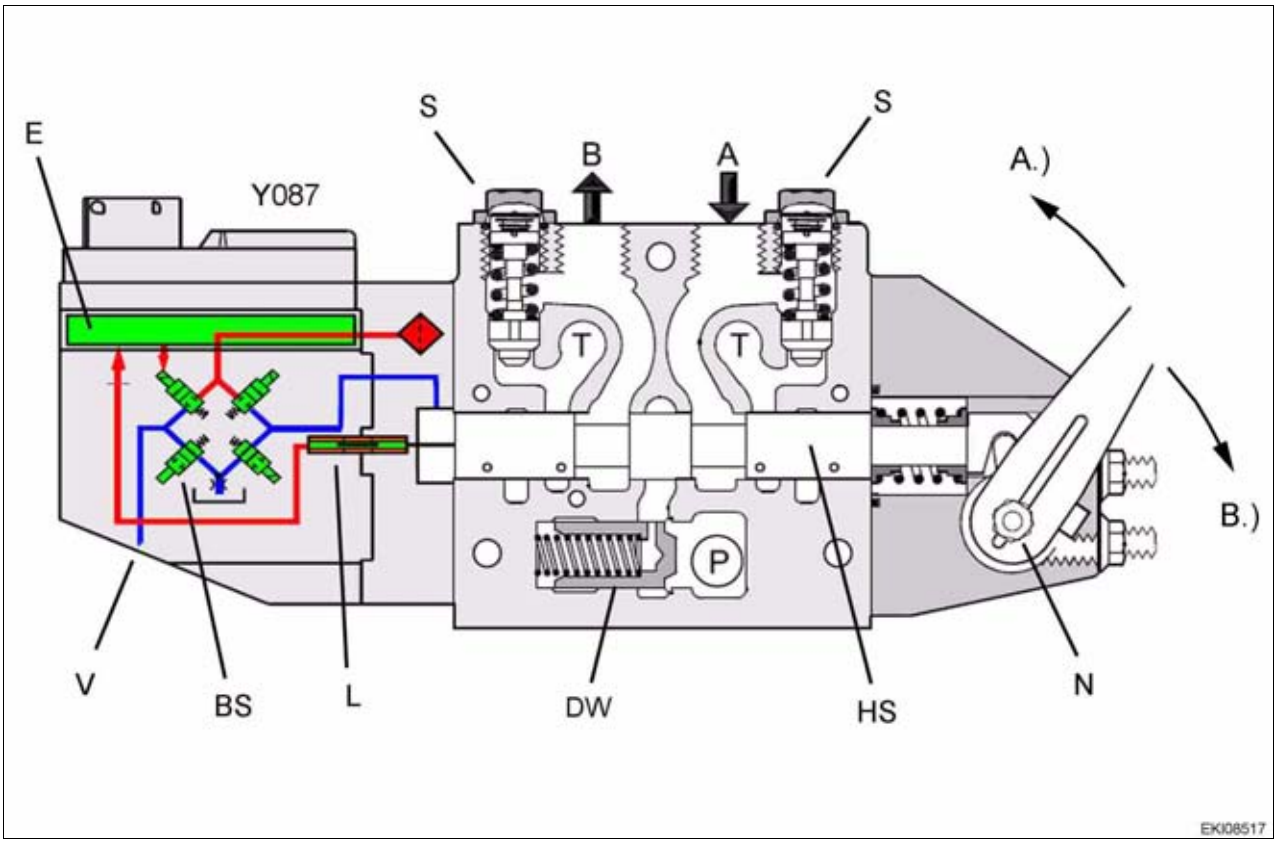


Fig. 599. I002336

Item	Designation	Item	Designation
Y087	**Autoguide control valve**	DW	Pressure compensator
A	Steering to left	E	Electronics
B	Steering to right	HS	Main actuator
T	Return flow	L	Position sensor
p	Pump pressure	**N**	**Manual operation of the Y087 control valve – Engine is running, pump pressure is applied** **A.) Turn emergency actuation to the left – tractor steers to right** **B.) Turn emergency actuation to the right – tractor steers to left** **Note: Steering wheel turns also!**
		S	Shock valve
BS	Bridge circuit	V	Pilot control unit

X1588 separation point "grey"	
X1589 separation point "black"	
Pin	**Function**
1	Valve bus (CAN low)
2	+ supply (+ UB 15)
3	Earth
4	Valve bus (CAN high)

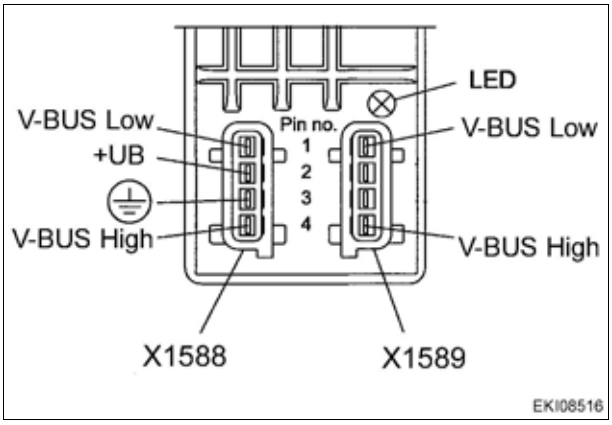


Fig. 600. I002198

NOTE: *see §20*
see §34
see §1

NOTE: *The **Y087** - Steering valve block, Auto-Guide is calibrated*
see §8

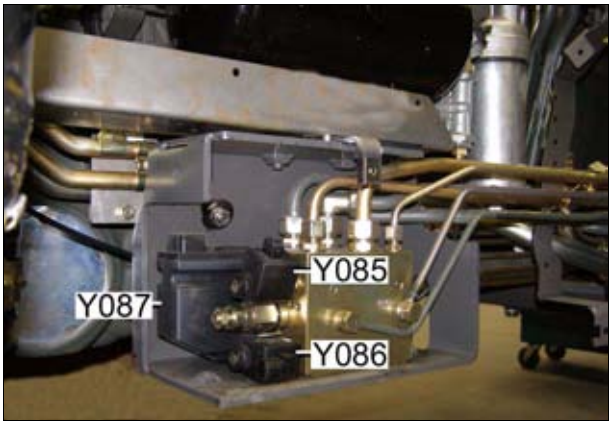


Fig. 601. I001987

155 Y091 dispensing unit (fuel)

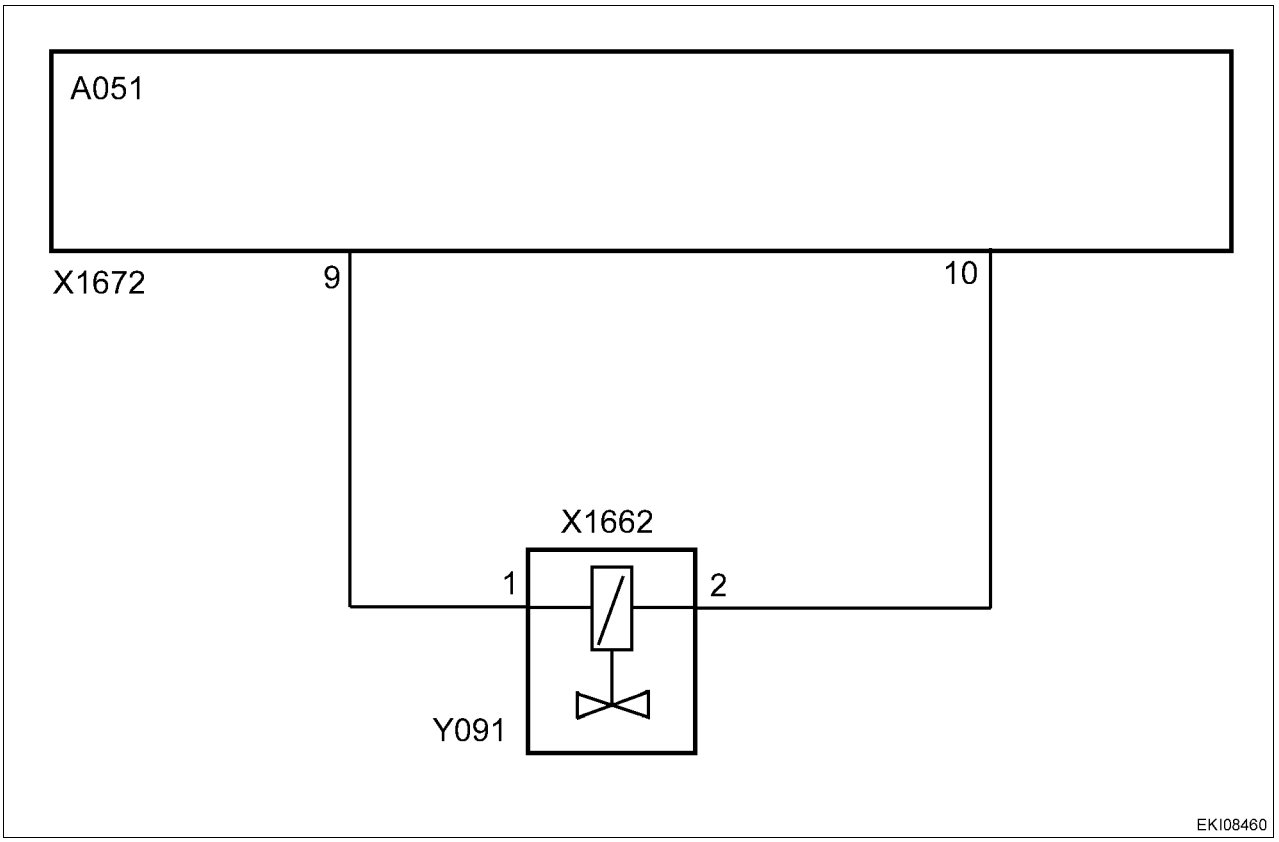


Fig. 602. I002115

Item	Designation	Note
A051 - ECU, engine control unit (EDC 7).		
X1672	Separation point on **A051** - ECU, engine control unit (EDC 7).	
Pin 9	Actuation of Y091 (high)	
Pin 10	Actuation of Y091 (low) "virtual earth"	
Y091 - Dispensing unit (fuel)		
X1662	Separation point on Y091	
Pin 1	Actuation (high)	
Pin 2	Actuation (low) "virtual earth"	

Measuring points and signal values

Measuring points on Y091 dispensing unit X1662 separation point	
Pin	**Function**
1	Actuation (high)
2	Actuation (low) "virtual earth"



Fig. 603. I001172

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Connect the adapter cable X899.980.259.104 directly to the component (plug adapter cable into the component only).

Test	Pin	Specified value	condition	Possible cause of fault
Actuation (high)	1	Approx 3.6 ohms +/- 15%	20 °C Coil resistance	
Actuation (low) "virtual earth"	2			

Measuring voltage (V)

Prerequisite for this measurement:

– The fuel primary pressure must be OK *see §3*

NOTE: *Connect the X899.980.259.104 adapter cable directly to the component.*
All readings +/- 10%.

Note: diesel engine without load				
Test	**Pin**	**Specified value**	**condition**	**Possible cause of fault**
Actuation (high)	1	Briefly 1.8 VDC, then 0 VDC	Ignition on, engine stationary	
		Approx. 4.3 VDC	Engine running (regardless of engine speed)	
Actuation (low)	2			

Measuring point on the A051 - ECU, engine control unit (EDC 7). (X1672 separation point)	
Function	**Pin**
Activation of **Y091** - Dispensing unit (fuel)	9
Earth	10

NOTE: *see §36*
see §37
see §5
see §3

NOTE: *Emergency mode:*
If the engine control unit detects a fault, it will activate emergency mode. Because the dispensing unit is no longer energised, the high-pressure pumps deliver their full stroke and the rail pressure rises. The high-pressure limiting valve DBV opens at a pressure of approx. 1800 bar. The engine can run in emergency mode for a maximum of 4 minutes. Because use of the DBV rapidly heats the fuel, the engine is switched off automatically by the engine.

156 Y092/Y093 solenoid valve, reverse drive control (Rüfa)

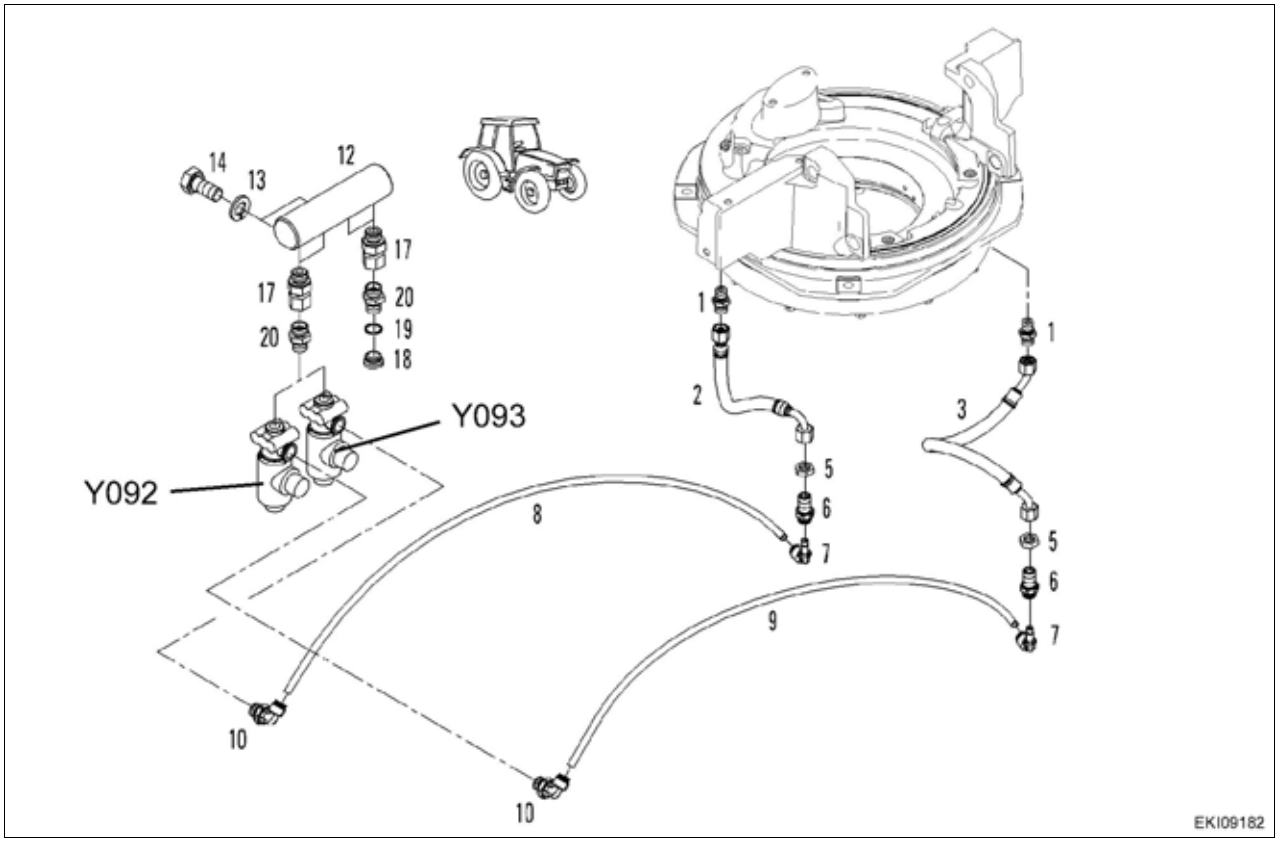


Fig. 604. Pneumatic support for the reverse drive control "Rüfa" I004827

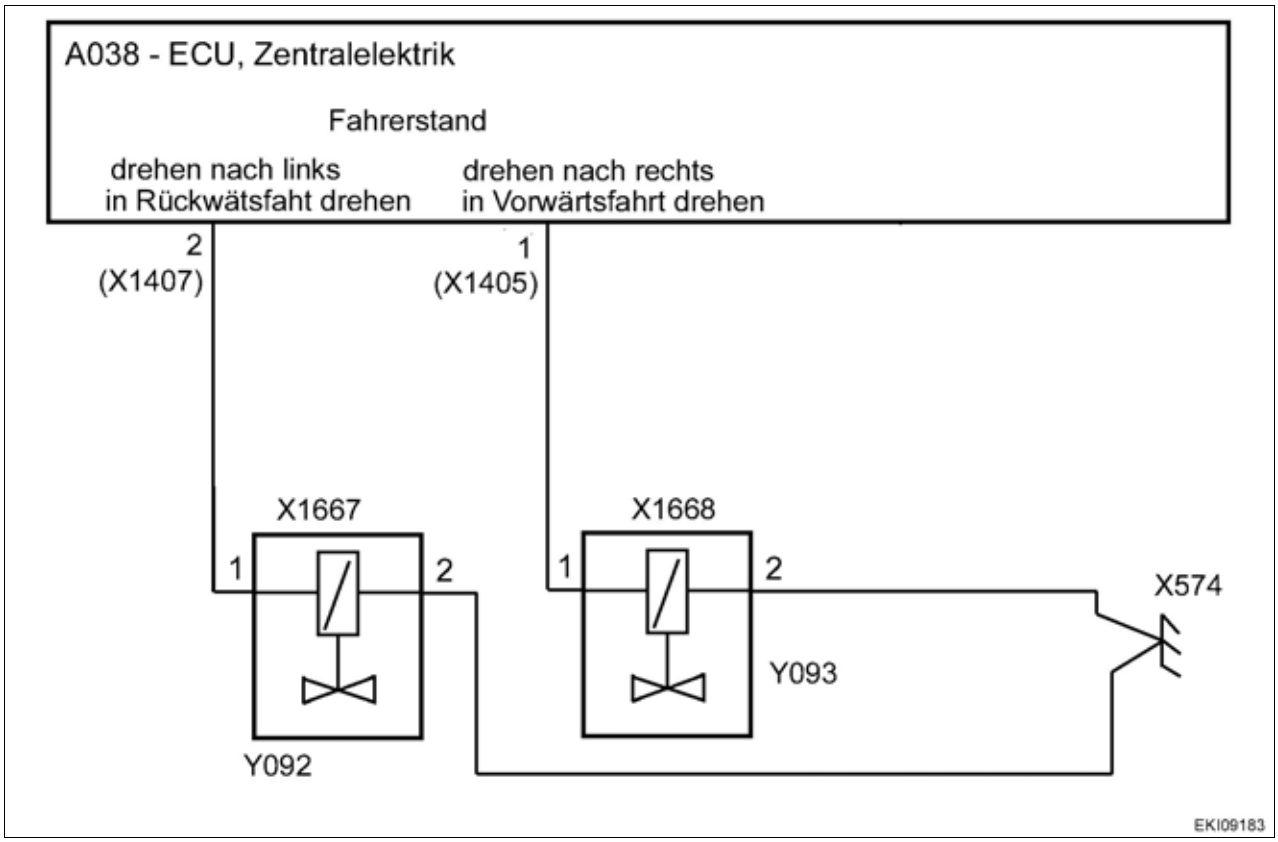


Fig. 605. I004828

Measuring points and signal values

Y092/Y093 solenoid valve	
Pin	**Function**
1	Actuation
2	Earth



Fig. 606. I001303

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
Measure pins directly on the component
All readings +/- 10%.

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1	Approx. 9.4 ohms	20 °C Coil resistance	
Earth	2			

Measuring the voltage (V)

NOTE: *Connect X899.980.304.000 adapter box and X899.980.304.203 adapter cable to the **A038** - ECU, central electrical system and measure the pins.* *see §16*

Prerequisite for this measurement:

- Use the **vehicle earth** to **earth**
- Compressed air system filled
- Engine OFF
- Switch on ignition.
- Hand brake applied

				Break in wiring	
Pin	**Pin**	**Signal type/condition**	**Signal**	**Signal from ECU**	**Signal from compo-nent**
Y092 - Solenoid valve, reverse operation (RÜFA), rotate to left					
D2 (X1407)	**Actuation**	Rotary drive not operated	0 VDC	0 VDC	0 VDC
		Rotary device operated	12 VDC (approx. 1.0 ADC)	12 VDC	0 VDC

				Break in wiring	
Pin	**Pin**	**Signal type/condition**	**Signal**	**Signal from ECU**	**Signal from compo-nent**
Y093 - Solenoid valve, reverse operation (RÜFA), rotate to right					
B1 (X1405)	**Actuation**	Rotary drive not operated	0 VDC	0 VDC	0 VDC
		Rotary device operated	12 VDC (1.0 ADC)	12 VDC	0 VDC

Fit outputs on A038 ECU, central electrical system, with a 55 W bulb.
Voltage drop max. 1 VDC from last reading

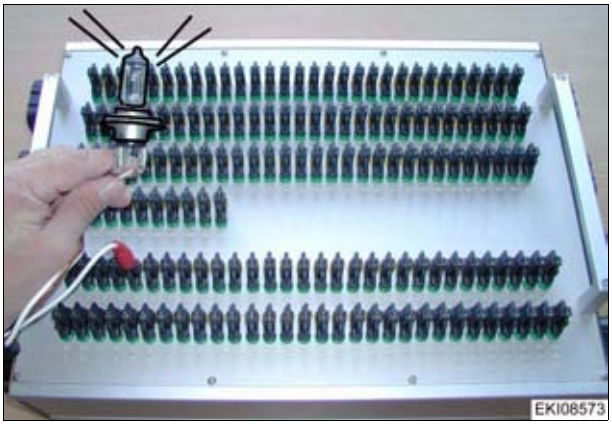


Fig. 607. I002375

NOTE: *see §15*
see §1

Compressed air system

NOTE: *See also:*
Chapter 8800 Reg.C - Compressed air system circuit diagram

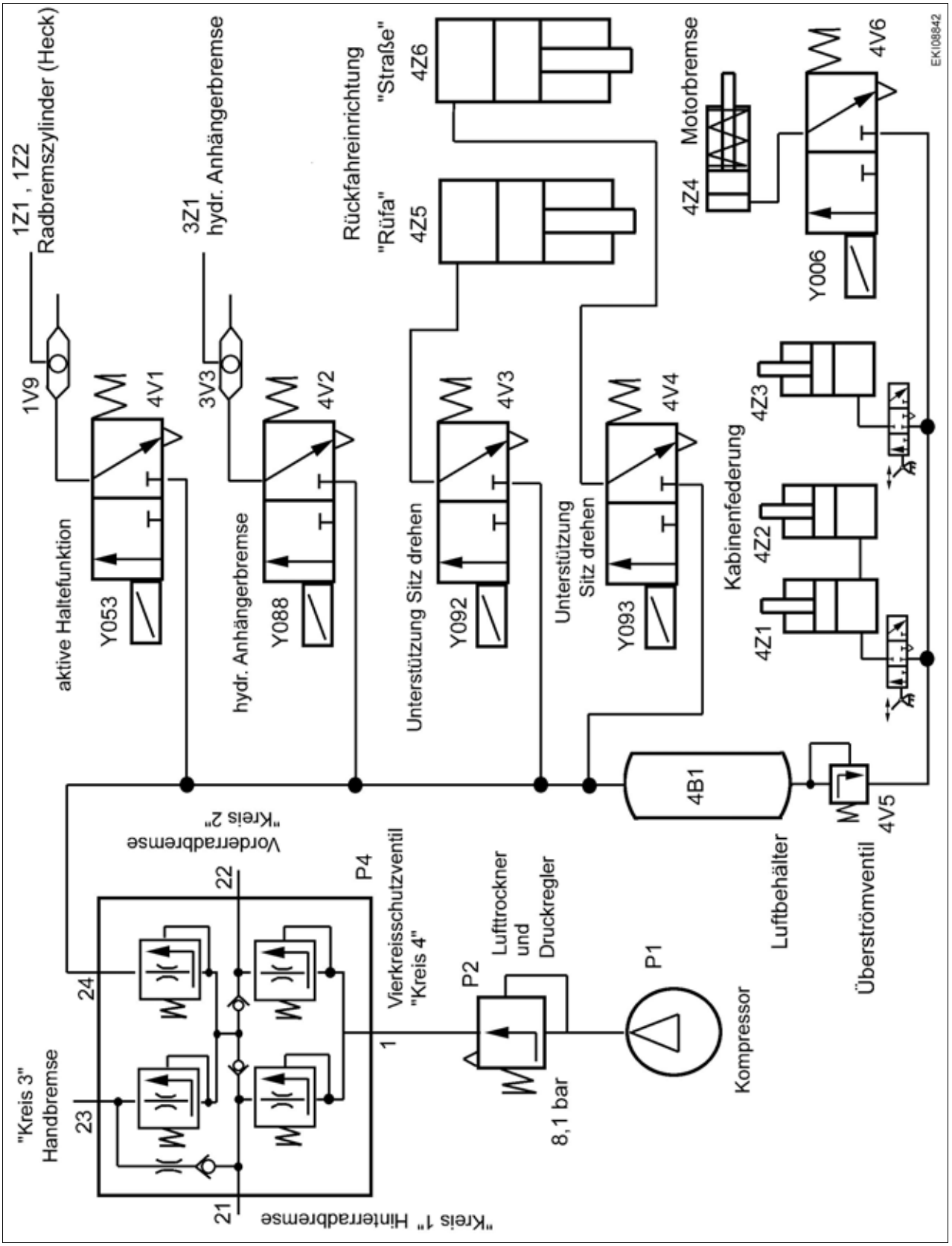


Fig. 608. I003091

157 Y094 exhaust gas recirculation actuator motor

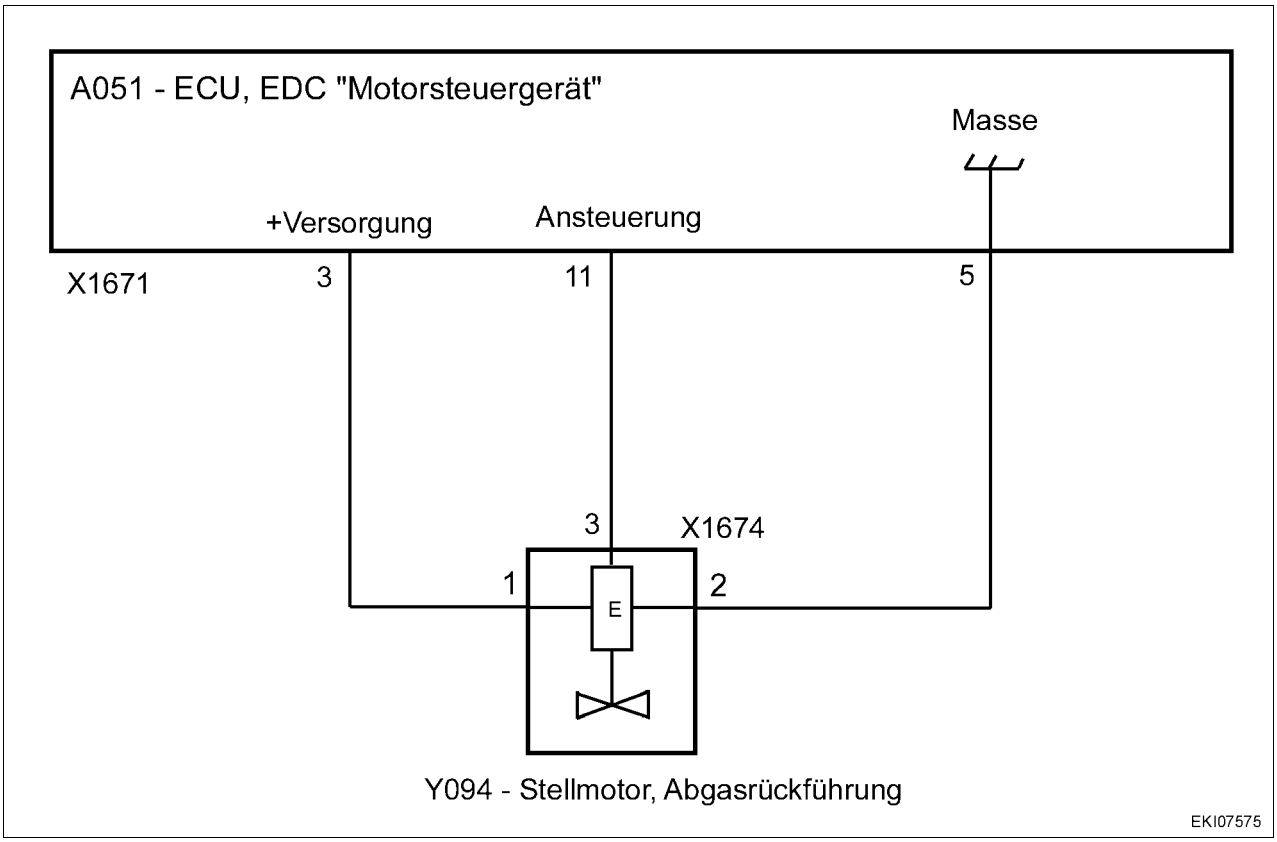


Fig. 609. I002119

Item	Designation	Note
A051 - ECU, engine control unit (EDC 7).		
X1671	Separation point on **A051** - ECU, engine control unit (EDC 7).	
Pin 3	+ supply (+UB 12 VDC)	
Pin 5	Earth	
Pin 11	Actuation	
Y094 - Actuator unit, AGR (exhaust gas recirculation)		
X1674	Separation point on Y094	
Pin 1	+ supply (+UB 12 VDC)	
Pin 2	Earth	
Pin 3	Actuation	

Measuring points and signal values

Measuring points on Y094 sensor X1674 separation point	
Pin	**Function**
1	+ supply (+UB 12 VDC)
2	Earth
3	Actuation
4	Not assigned
5	Not assigned

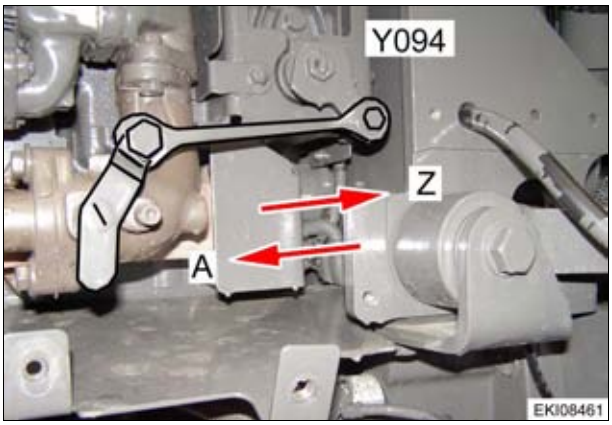


Fig. 610. I001846

Measuring points on A051 - ECU, engine control unit (EDC 7). (X1671)	
Pin	**Function**
3	+ supply (+UB 12 VDC)
5	Earth
11	Actuation

Measuring resistance (ohms)

NOTE: *Switch off ignition*
Connect adapter box X899.980.304.000 to ***A051*** *- ECU, engine control unit (EDC 7).*
Measure pins with multimeter (ohmmeter)

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	11	Approx. 56.6 Kohms	20 °C Coil resistance	
Earth	5			

Measuring the voltage supply (V)

NOTE: *Switch off ignition*
Connect adapter box X899.980.304.000 to ***A051*** *- ECU, engine control unit (EDC 7).*
Measure pins with multimeter (voltmeter)
Switch on ignition.

Test	Pin	Specified value	condition	Possible cause of fault
+ supply	3	12 VDC		
Earth	5			

Measuring the activation (V)

NOTE: *Switch off ignition*
Connect adapter box X899.980.304.000 to ***A051*** *- ECU, engine control unit (EDC 7).*
Measure pins with multimeter (voltmeter)
Start engine, run unladen

Test	Pin	Specified value	condition	Possible cause of fault
Actuation	11			
		0.5 VDC	800 rpm	

Test	Pin	Specified value	condition	Possible cause of fault
		0.5–1.4 VDC	1200 rpm	
		0.5–2.0 VDC	1600 rpm	
		0.5–2.7 VDC	2000 rpm	
		0.5–2.7 VDC	2200 rpm	
Earth	5			

NOTE: *see §36*
see §37
see §1

Y094 **Exhaust gas recirculation actuator motor**
X1674 Separation point on Y094

A **Exhaust flap open**
Z **Exhaust flap closed**



On left side of engine.

After ignition ON, the **Y094** - Actuator unit, AGR (exhaust gas recirculation) moves to the exhaust flap stops. Within the stops, the **A051** - ECU, engine control unit (EDC 7). controls the position of the exhaust flap depending on the engine load.

NOTE: *If a new Y094 actuator motor is installed:*
Start by hooking in the mechanical linkage on the Y094 actuator motor,
then switch the ignition ON, so that the Y094 actuator motor calibrates the stops of the exhaust flap.
(If the ignition is turned on when the linkage is not attached, the calibration will be carried out incorrectly. The incorrect calibration can not be reset!)

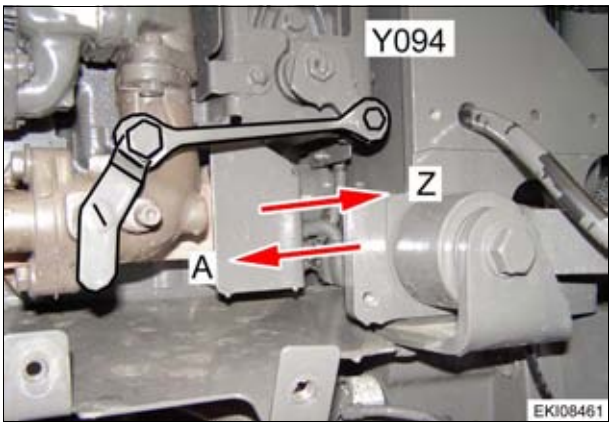


Fig. 611. I001846

158 Y095 to Y098, Y100, Y101 - injectors 1 to 6

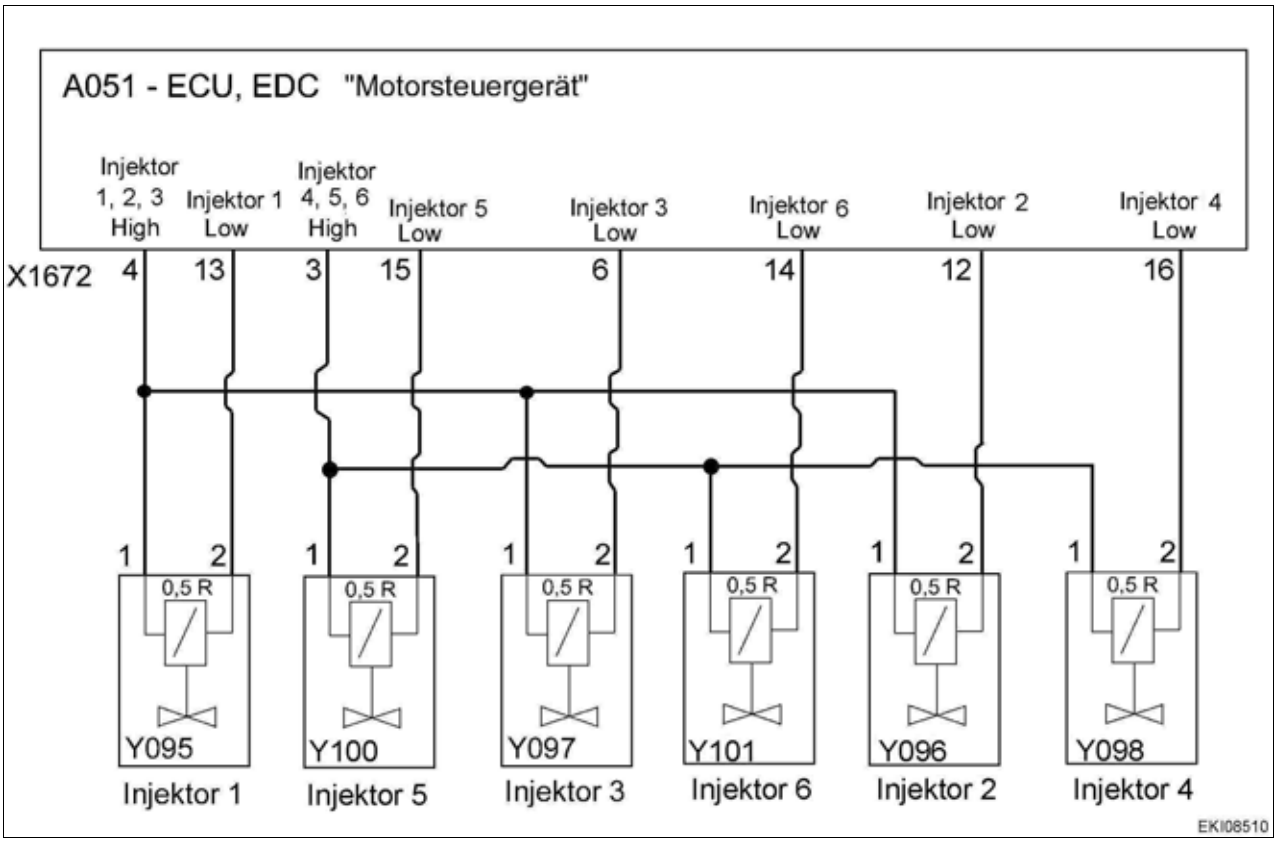


Fig. 612. I002174

Item	Designation	Note
A051	ECU, engine control unit	
X1672	Separation point on A051 ECU	
Pin 3	Injector 4, 5, 6 (high)	
Pin 4	Injector 1, 2, 3 (high)	
Pin 6	Injector 3 (low)	Actuation of injector 3
Pin 12	Injector 2 (low)	Actuation of injector 2
Pin 13	Injector 1 (low)	Actuation of injector 1
Pin 14	Injector 6 (low)	Actuation of injector 6
Pin 15	Injector 5 (low)	Actuation of injector 5
Pin 16	Injector 4 (low)	Actuation of injector 4
Y095	Injector 1 (on flywheel)	
Y096	Injector 2	
Y097	Injector 3	
Y098	Injector 4	
Y100	Injector 5	
Y101	Injector 6	
Note: **Firing sequence: 1 - 5 - 3 - 6 - 2 - 4.**		

Measuring points and signal values

Measuring points on the A051 - ECU, engine control unit (EDC 7). X1672 separation point	
Pin	**Function**
3	Injector 4, 5, 6 (high)
4	Injector 1, 2, 3 (high)
6	Injector 3 (low)
12	Injector 2 (low)
13	Injector 1 (low)
14	Injector 6 (low)
15	Injector 5 (low)
16	Injector 4 (low)

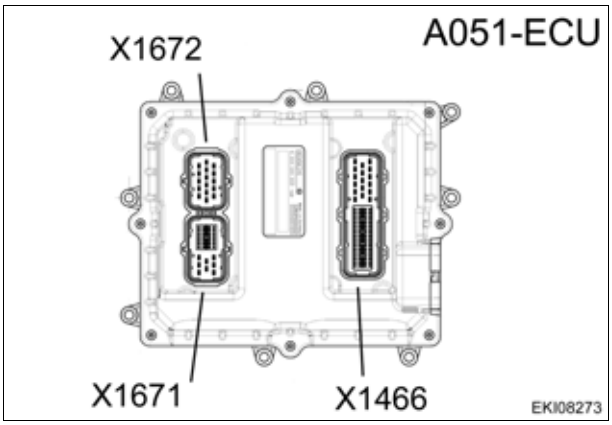


Fig. 613. I001388

Measuring resistance (ohms)

NOTE: *Switch off ignition.*
*Connect the X899.980.304.000 adapter box to the **A051** - ECU, engine control unit (EDC 7)..*
Open corresponding pins
Measure pins to injector using a multimeter (ohmmeter)

Pin (X1672)	**Injector**	**Specified value**
4 and 13	Y095 injector 1	0.5 ohms
4 and 12	Y096 injector 2	0.5 ohms
4 and 6	Y097 injector 3	0.5 ohms
3 and 16	Y098 injector 4	0.5 ohms
3 and 15	Y100 injector 5	0.5 ohms
3 and 14	Y101 injector 6	0.5 ohms

Measuring voltage (V)

NOTE: *Switch off ignition.*
*Connect the X899.980.304.000 adapter box to the **A051** - ECU, engine control unit (EDC 7)..*
Measure pins to injector using a multimeter (voltmeter).
Switch on ignition, engine is running.

Note: engine without load		
Pin (X1672)	**Injector**	**Specified value (approx. values)**
4 and 13	Y095 injector 1	800 rpm = 50 mVDC
4 and 12	Y096 injector 2	1200 rpm = 67 mVDC
4 and 6	Y097 injector 3	1600 rpm = 80 mVDC
3 and 16	Y098 injector 4	2000 rpm = 95 mVDC
4 and 15	Y100 injector 5	2200 rpm = 100 mVDC
3 and 14	Y101 injector 6	

Oscilloscope display

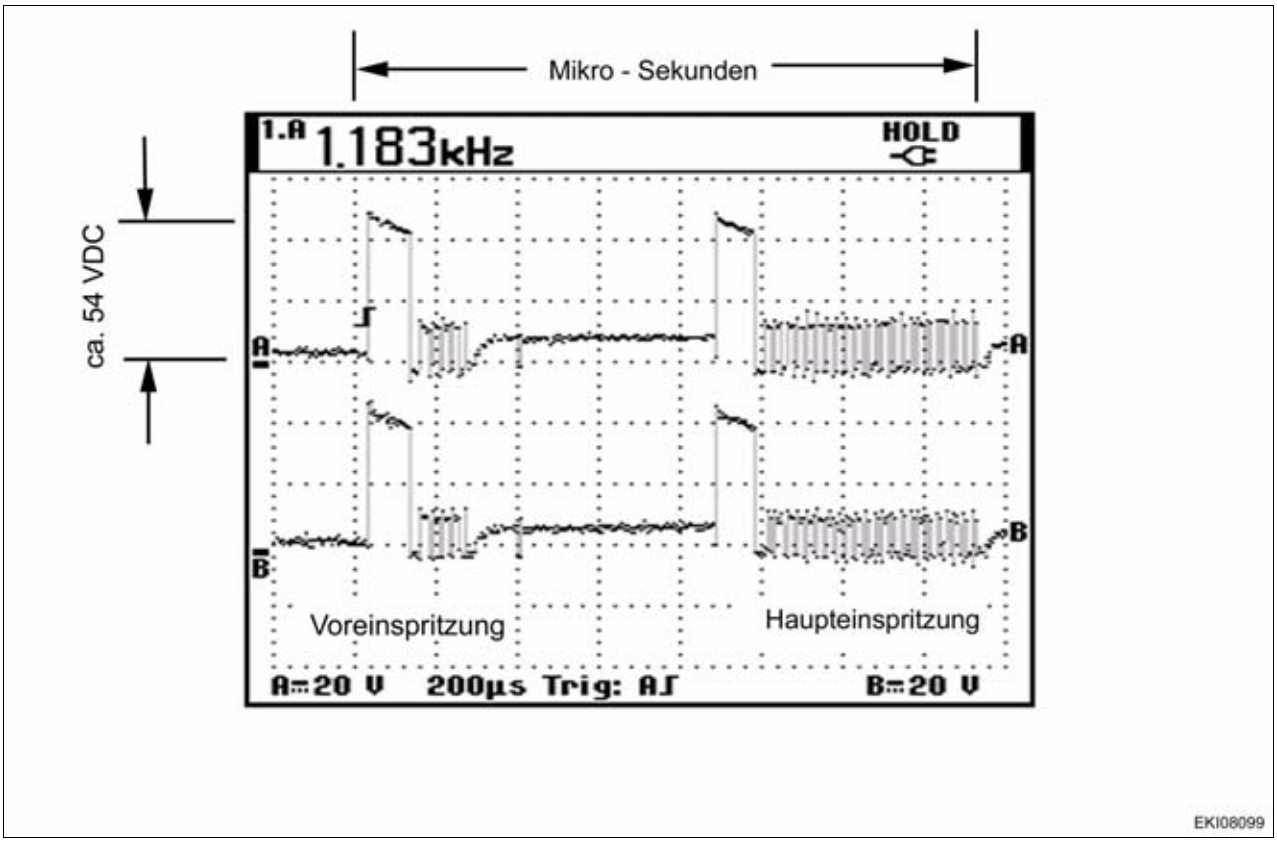


Fig. 614. I002154

Check hydraulic function of Y injectors "cylinder switch-off"

NOTE: *Switch off ignition.*
Connect the X899.980.304.000 adapter box to the ***A051*** *- ECU, engine control unit (EDC 7)..*
Switch ignition on and start engine.
Switch off injectors consecutively and observe engine running characteristics.
Open corresponding pins (see table below).
If the engine running characteristics do not change, the injector is faulty.

Note: engine without load		
Note: Observe engine running characteristics. If the engine running characteristics do not change, the injector is faulty.		
Note: Y095 injector 1 (on flywheel side)		
Pin (on X1672)	**Open pin**	**The following are switched off:**
4 and 13	13	Y095 injector 1
4 and 12	12	Y096 injector 2
4 and 6	6	Y097 injector 3
3 and 16	16	Y098 injector 4
3 and 15	15	Y100 injector 5
3 and 14	14	Y101 injector 6

NOTE: *see §36*
see §37
see §9
see §1
see §1

NOTE: *See also: DEUTZ TCD 2013 L06 V4 Workshop Manual.*

A	General
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Electrical system/starter lockout

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F Setting and calibrating

1 Teaching in the vehicle key 7
2 Teach in the B083 immobiliser control unit and/or A051 ECU, engine control unit 11

1 Teaching in the vehicle key

The following preliminary work must be carried out:

- All 3 **BLUE** vehicle keys for **B083** - Immobiliser control **or**
  all 3 **ORANGE** vehicle keys for **A077** - Immobiliser ECU are to be available and kept separate from each other.
- The first vehicle key is in the ignition
- Ignition on.

CAUTION: After carrying out "Step 1 - Key teach-in", the tractor can no longer be started until the end of the procedure with "Step 3 - Apply activation package".

Programming is carried out in three steps:

1. Step 1 - Key teach-in
2. Step 2 - Create package
3. Step 3 - Apply activation package

NOTE: *In the event of outdated software versions in the **B083** - Immobiliser control, the most recent software version is loaded first automatically (see message in the status line).*

BLUE vehicle keys for **B083 - Immobiliser control**	**ORANGE** vehicle keys for **A077 - Immobiliser ECU**
– Are deleted in the first step and then taught into the new chassis number.	– Previously taught-in **ORANGE** vehicle keys can only be used for the same **A077** - Immobiliser ECU. – New **ORANGE** vehicle keys can only be taught in once on a **A077** - Immobiliser ECU.
– Need only be held up to the ignition one after the other	– Must be put in the ignition one after the other The ignition key must **not** be turned.
– For each **BLUE** vehicle key, you must wait **10 seconds**	– For each **ORANGE** vehicle key, you must wait **15 seconds**

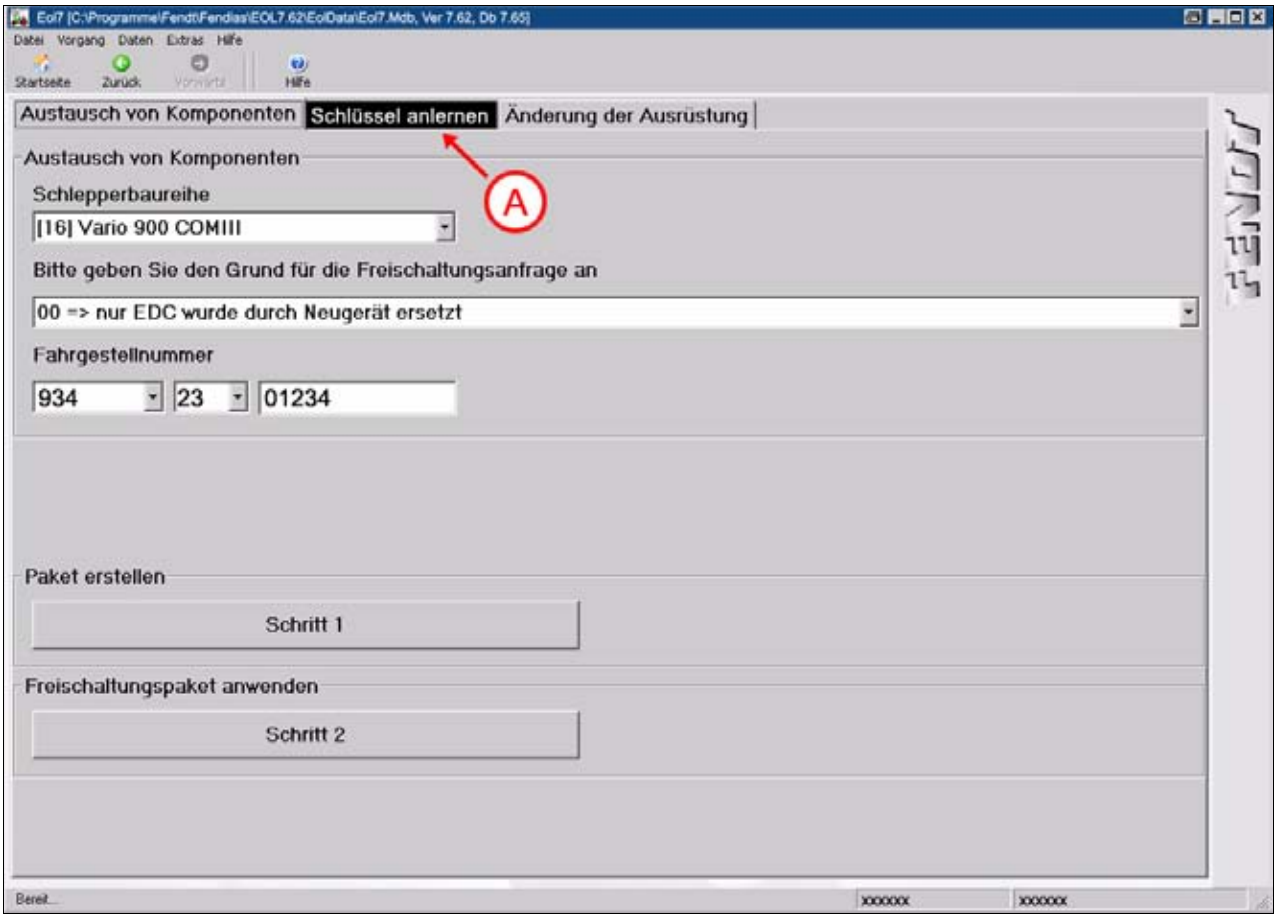


Fig. 1. I009414

Click on the **KEY TEACH-IN** tab (A) to switch to the "Key teach-in" menu page

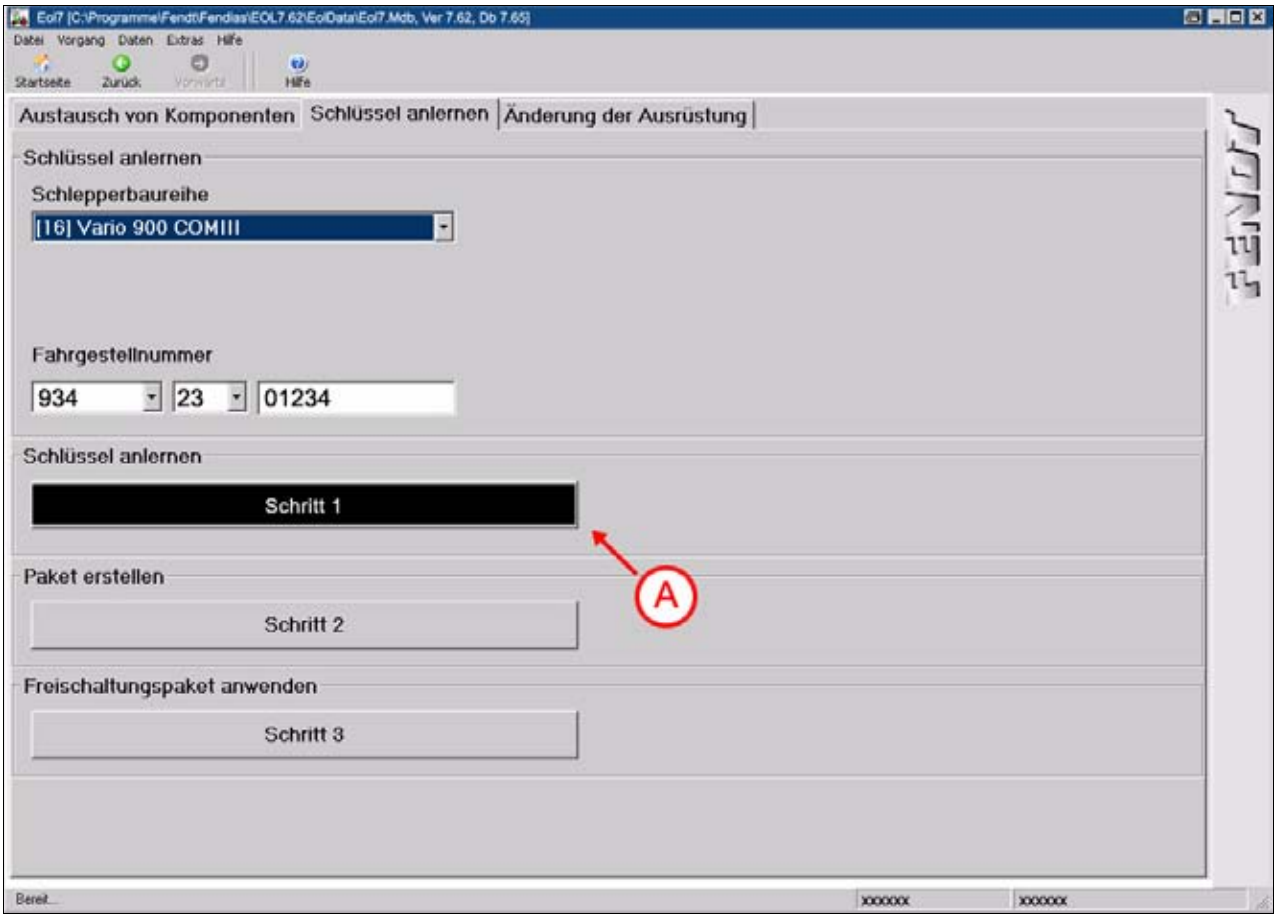


Fig. 2. I009416

NOTE: *Check the fields for the tractor series and chassis number; these should already contain the correct values.*

IMPORTANT: *Information for all immobiliser teach-ins:*
*Make sure to enter the correct data; otherwise the tractor may be immobilised or, in some circumstances, the activation procedure may also be blocked. This may require components **B083** - Immobiliser control/**A077** - Immobiliser ECU and/or **A051** - ECU, engine control unit (EDC 7). to be replaced.*

The security window is shown, indicating that the tractor will be immobilised from this program point on.



Fig. 3. I002088

Confirm with **OK**, then the actual teach-in process will start.

NOTE: *Any previously taught-in vehicle keys will be deactivated first!*

Description of "Key teach-in" process:
If a key with transponder is in the ignition, it is taught in immediately. The key must be removed from the ignition to allow other keys to be taught in. 3 keys must be taught in.

BLUE keys	**ORANGE** keys
The additional keys that are to be taught in need only be held up to the ignition one after the other. There must be only one key inserted in the ignition for recognition purposes. Please also ensure that you have a maximum of 10 seconds during the teach-in process to teach in each additional key.	The additional keys that are to be taught in need only be put into the ignition one after the other. The ignition key must **not** be turned.
Once the period of **10 seconds** (whenever a new key has been recognised) has elapsed, the complete teach-in procedure is terminated.	Once the period of **15 seconds** (whenever a new key has been recognised) has elapsed, the complete teach-in procedure is terminated.

a Symbol for key teach-in process

b Number of keys that have been taught in up to now (in this case: 0)

c Time remaining to teach in this key (in this case: 6 seconds)

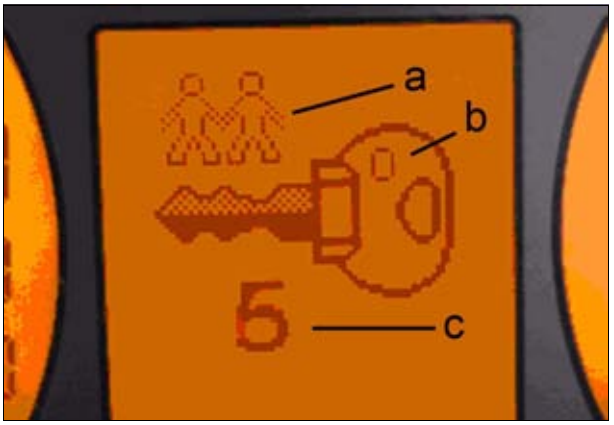


Fig. 4. Display in the VDO instrument panel: I002266

If the "Key teach-in" process has failed, it can be repeated (e.g. if not all vehicle keys have been taught in). However, the tractor remains unready for operation during the process.

You can only continue to **"Step 2"** (create package) in the EOL once all keys have been taught in successfully.

2 Teach in the B083 immobiliser control unit and/or A051 ECU, engine control unit

Reasons:

- **B083 immobiliser control unit** faulty --> had to be replaced with a new unit
- **A051 ECU, engine control unit** faulty--> had to be replaced with a new unit
- **B083 immobiliser control unit** and **A051 ECU, engine control unit** faulty--> both had to be replaced with new units
- It is not necessary to activate the immobiliser for any other electric components

Important:

- **Used components cannot be activated for testing purposes in another tractor etc. This is specifically intended to prevent cross connections that can no longer be tracked and situations such as 'Where is which activation?'; 'Which vehicle key fits where?' etc. It is also not possible to create activation codes at the factory; these are blocked.**
- ONLY new components that have not yet been activated can be taught in.
- If the immobiliser (B083 and/or A051) must be replaced, all vehicle keys must also be re-taught; please have the full number available to start out.
- The activation mechanisms must be used with the utmost care. Please do not carry out experiments (changing used components, changing the chassis numbers etc.).

Starting position:

- New component(s) (B083 and/or A051) were already installed
- Tractor is programmed with the most recent version of EOL7.58 DB7.55 or higher
- In general, the tractor's immobiliser function has already been activated at the factory or during restoration
- In the event of a new **B083 immobiliser control unit:** All vehicle keys are at hand ("ready for teach-in process")

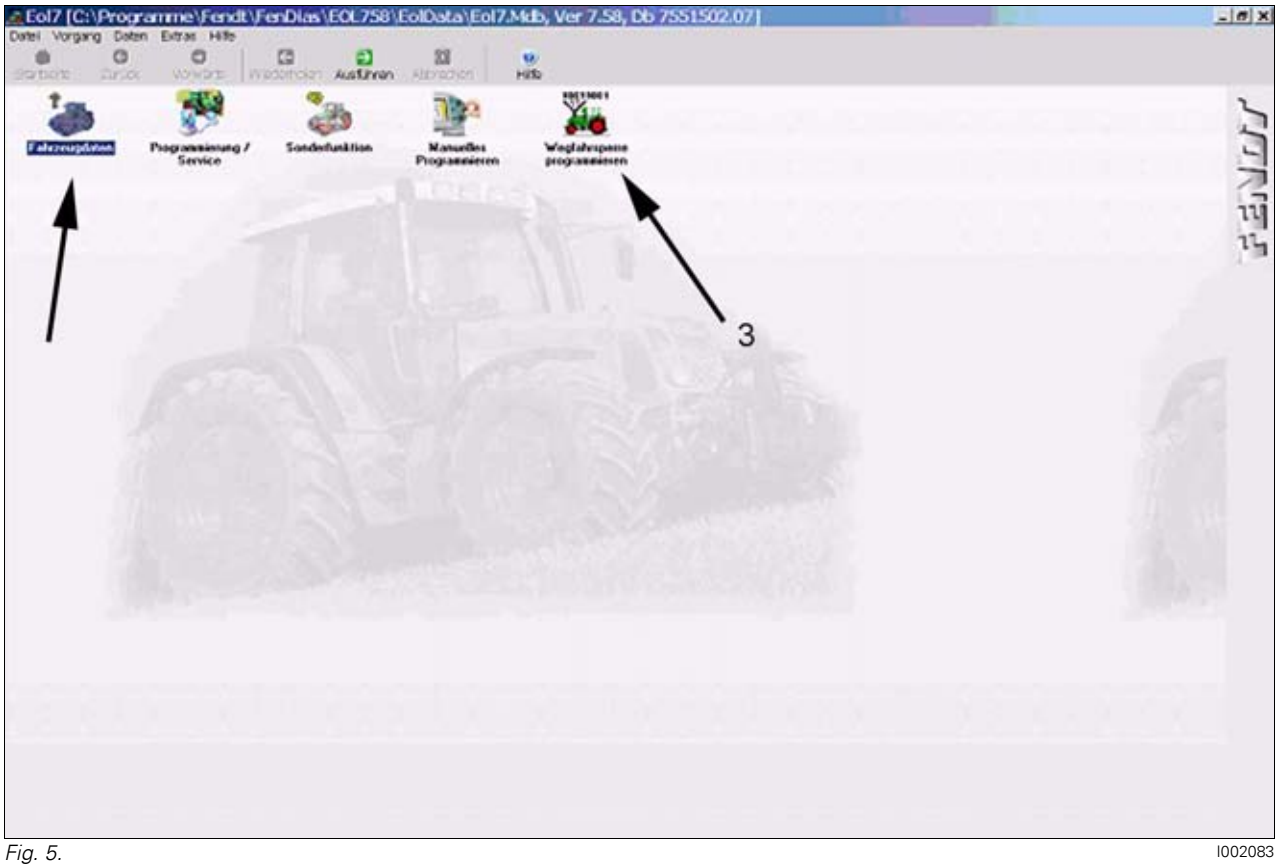


Fig. 5. I002083

NOTE: *On programming*
– Observe charge level of G001 battery

1. Ignition ON.

2. Start EOL7.58 DB7.55 (or higher)
3. Double-click "Program immobiliser" to change to menu page

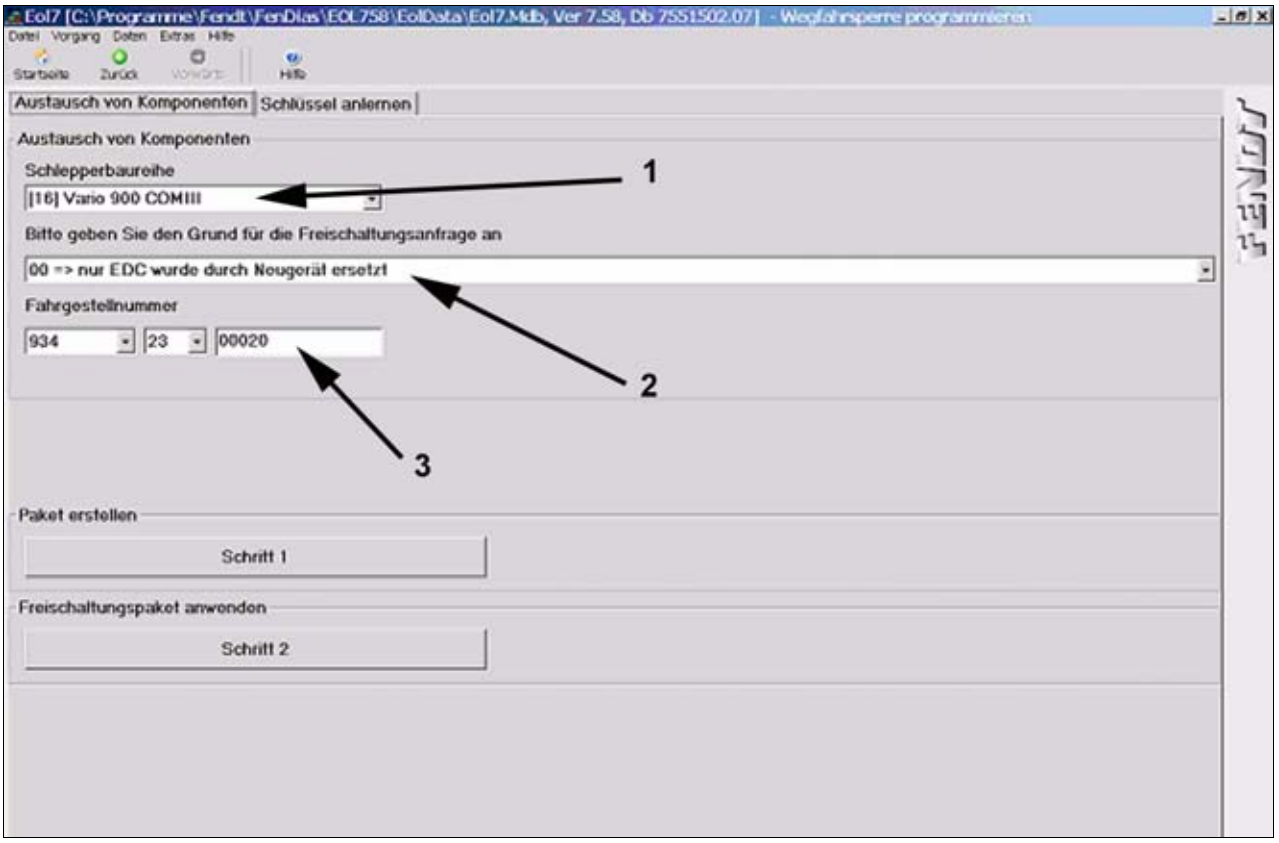


Fig. 6. I002084

Important information for all immobiliser teach-ins:

Make sure to enter the correct data, do not try to enter e.g. other chassis numbers. Doing so may immobilise the tractor and possibly block the activation procedure. This may necessitate replacing the B083 immobiliser control unit and/or the A051 ECU, engine control unit.

1. Enter the correct tractor series, here "Vario 900 COMIII".
2. It is essential that you enter the item "Please enter the reason for the activation request" correctly, as this is used to control the contents of the activation packages.
   Possible entries:
   a. **00** –> only **A051 ECU, engine control unit (EDC)** was replaced
   b. **01** –> only **B083 immobiliser control unit** was replaced
   c. **02** –> **A051 ECU, engine control unit (EDC)** and **B083 immobiliser control unit (IMMO)** were replaced
3. Make sure to enter the complete and correct chassis number.
4. Depending on the reason for the activation request, two different menu contents A) or B) can be displayed.

A)

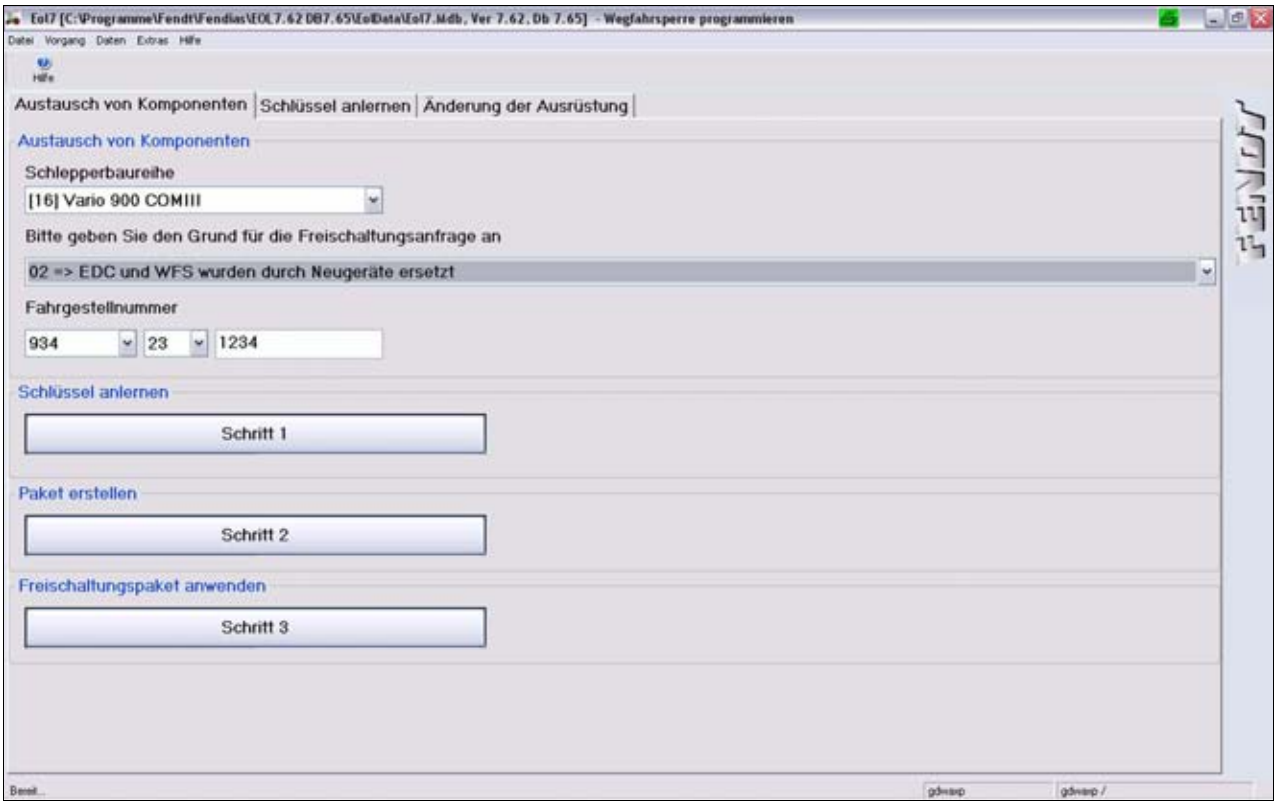


Fig. 7. I002085

3 steps are displayed (additionally: "Key teach-in")

01 –> only **B083 immobiliser control unit** was replaced

02 –> **A051 ECU, engine control unit (EDC)** and **B083 immobiliser control unit (IMMO)** were replaced

As a rule, the additional step 1 in A) ("Key teach-in") is always required if the **B083 immobiliser control unit** needs to be replaced. **All additional ignition keys should therefore be kept to hand for teach-in purposes.**

B)

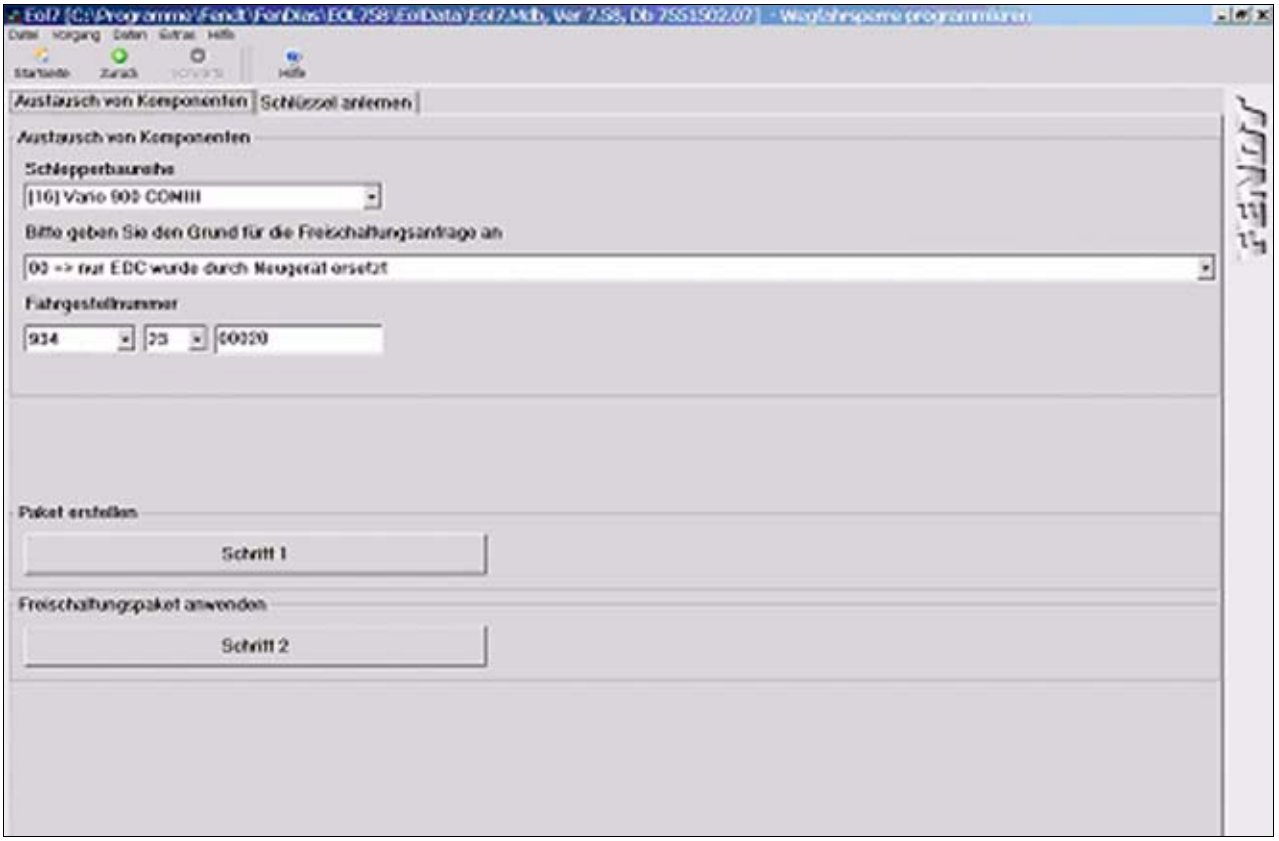


Fig. 8. I002086

Only 2 steps are displayed in the event of reason

00 –> only **A051 ECU, engine control unit (EDC)** was replaced.

NOTE: *If only the A051 ECU, engine control unit (EDC) is replaced, no vehicle keys must be newly taught in.*

Additional procedure "Key teach-in" for A):

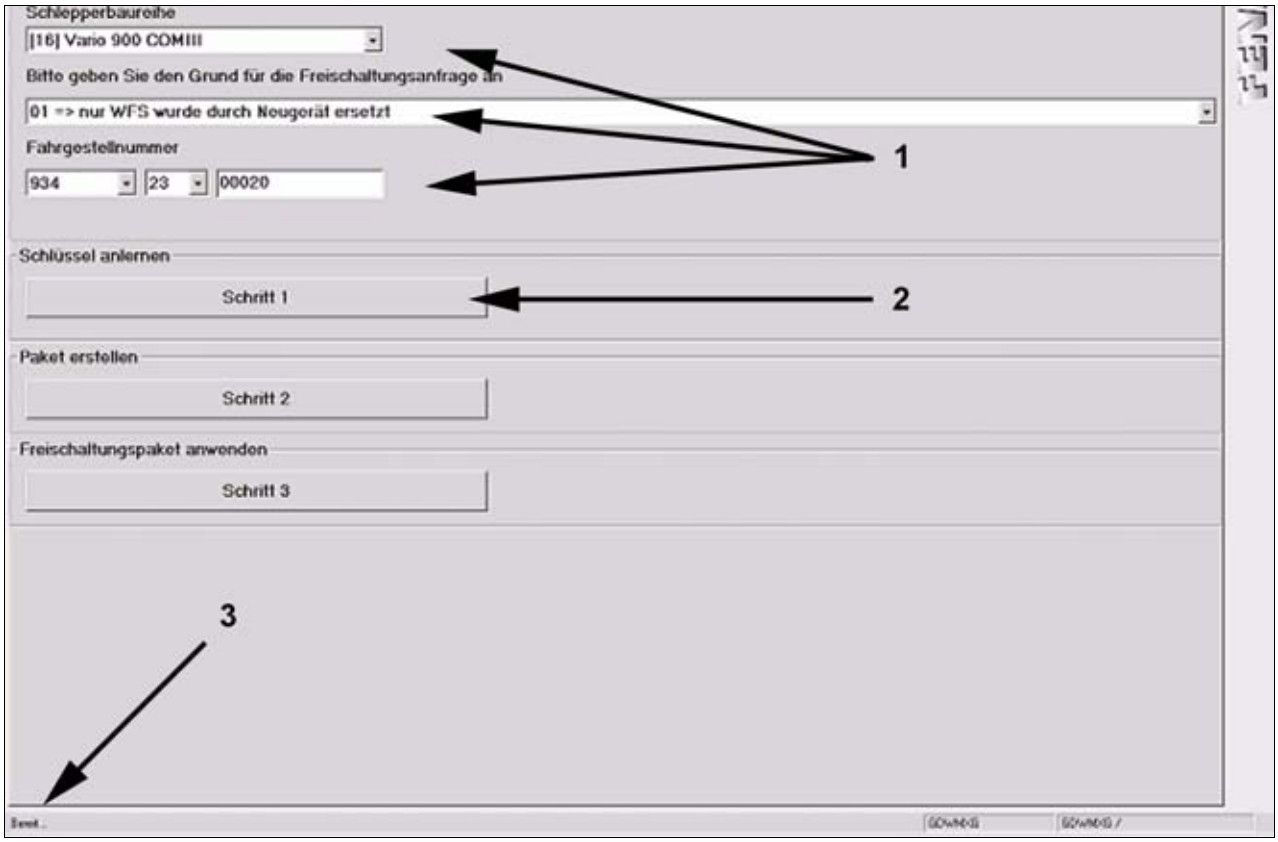


Fig. 9. I002087

1. Make entries as described above
2. Click "Step 1" –> "Key teach-in"
3. If necessary, the status line can be used to monitor the programming procedure. In the event of outdated software versions in the immobiliser control unit, the most recent software version is uploaded automatically (message "Download…").



Fig. 10. I002088

The safety window is shown indicating that the tractor will be immobilised from this program point on.

1. Confirm with OK, the actual teach-in process will start thereafter.
2. Important: Any previously taught-in vehicle keys will be deactivated!

Description of "Key teach-in" process:
If a key with transponder is in the ignition, it is taught in immediately. The key must be removed from the ignition to allow other keys to be taught in. The additional keys that are to be taught in need only be held up to the ignition one after the other. There must be only ever be one key with transponder inserted in the ignition for recognition purposes. A maximum of 3 keys can be taught in. Please also note that you have a maximum of 10 seconds during the teaching process to teach in each additional key.

Once the period of 10 seconds (whenever a new key has been recognised) has elapsed, the complete teach-in procedure is terminated.

Display in the VDO instrument panel:

a	Keys can be taught in
b	"0" keys are currently taught in
c	You have 6 seconds to teach in a key

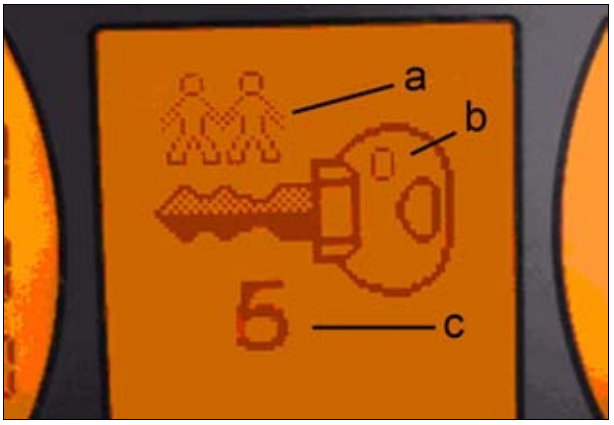


Fig. 11. I002266

Display in the VDO instrument panel:

d	Keys can be taught in
e	"1" key has been taught in at this time
f	You have 7 seconds to teach in another key

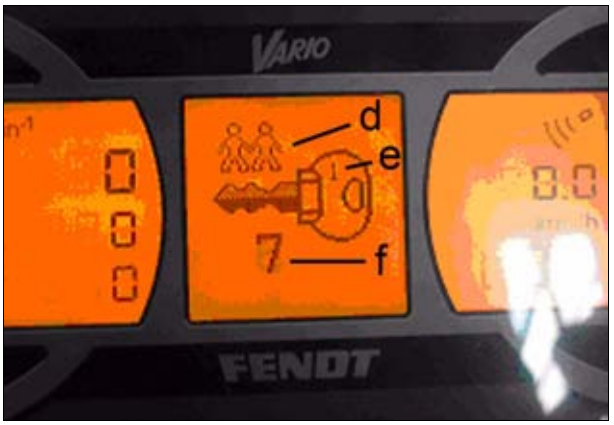


Fig. 12. I002267

Display in the VDO instrument panel:

g	Keys can be taught in
h	"2" keys are currently taught in
i	You have 6 seconds to teach in another key



Fig. 13. I002268

If the "Key teach in" process has failed, it can be repeated (e.g. if not all vehicle keys have been taught in). However, the tractor remains unready for operation during the process.

You can only continue to "Step 2" in the EOL once all keys have been taught in successfully.

The other steps "Create package" and "Apply activation package" will be described at the same time from here on, as they are handled in the same way for cases A) and B).

A)

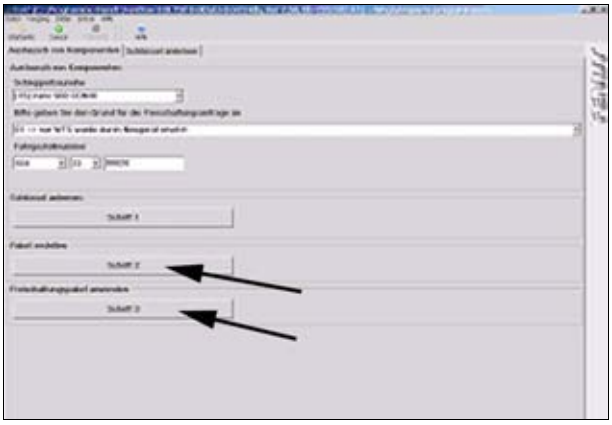


Fig. 14. I002269

B)

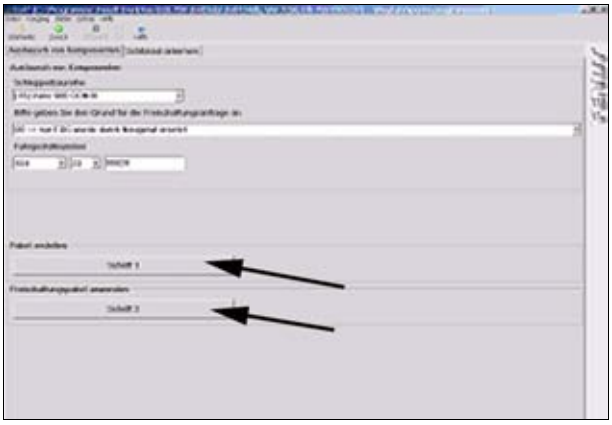


Fig. 15. I002270

NOTE: *The tractor is only immobilised by the activation in case A). In case B), the tractor is not immobilised and theoretically, it could still run after the activation package has been created. In reality however, the tractor is not ready for operation due to the prior installation of the new immobiliser and/or EDC7.*

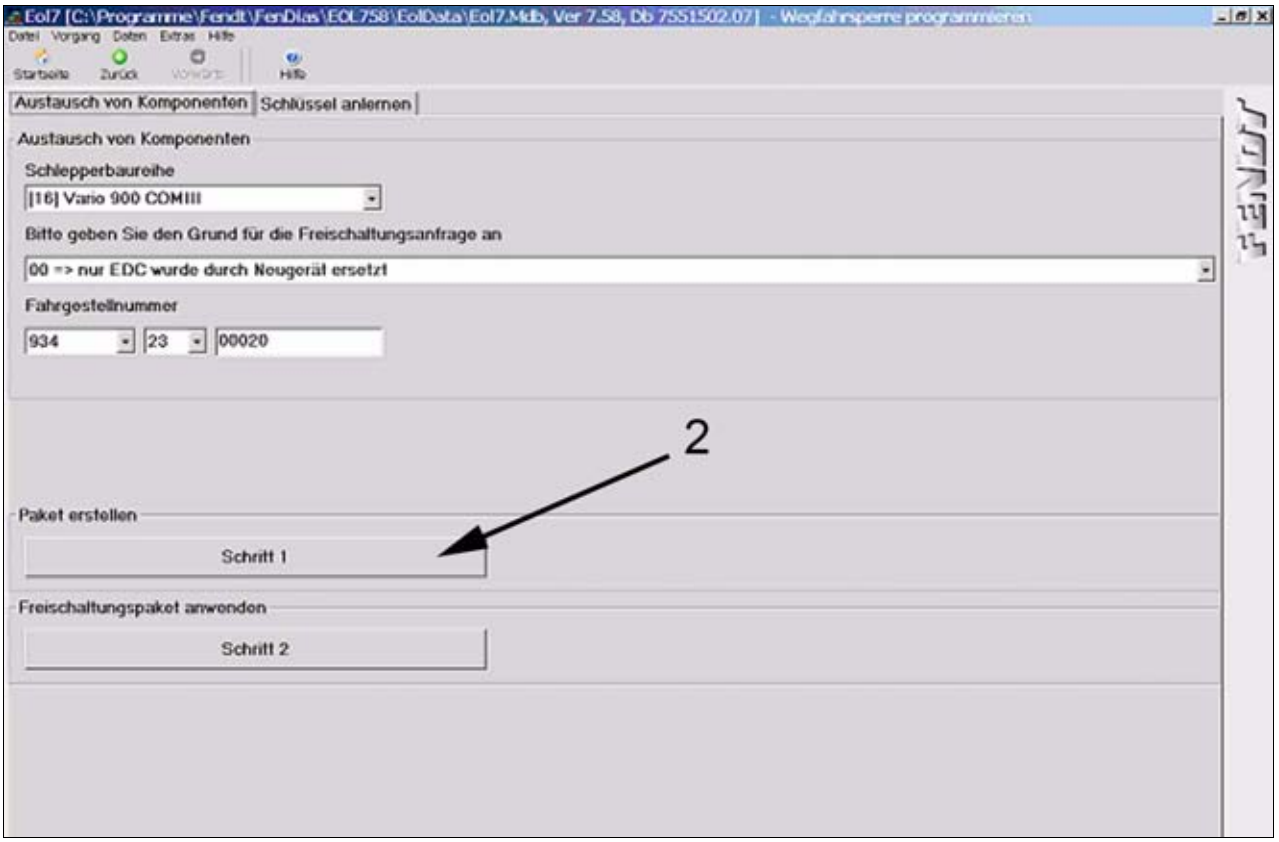


Fig. 16. I002271

1. Ignition on
2. Click "Create package"

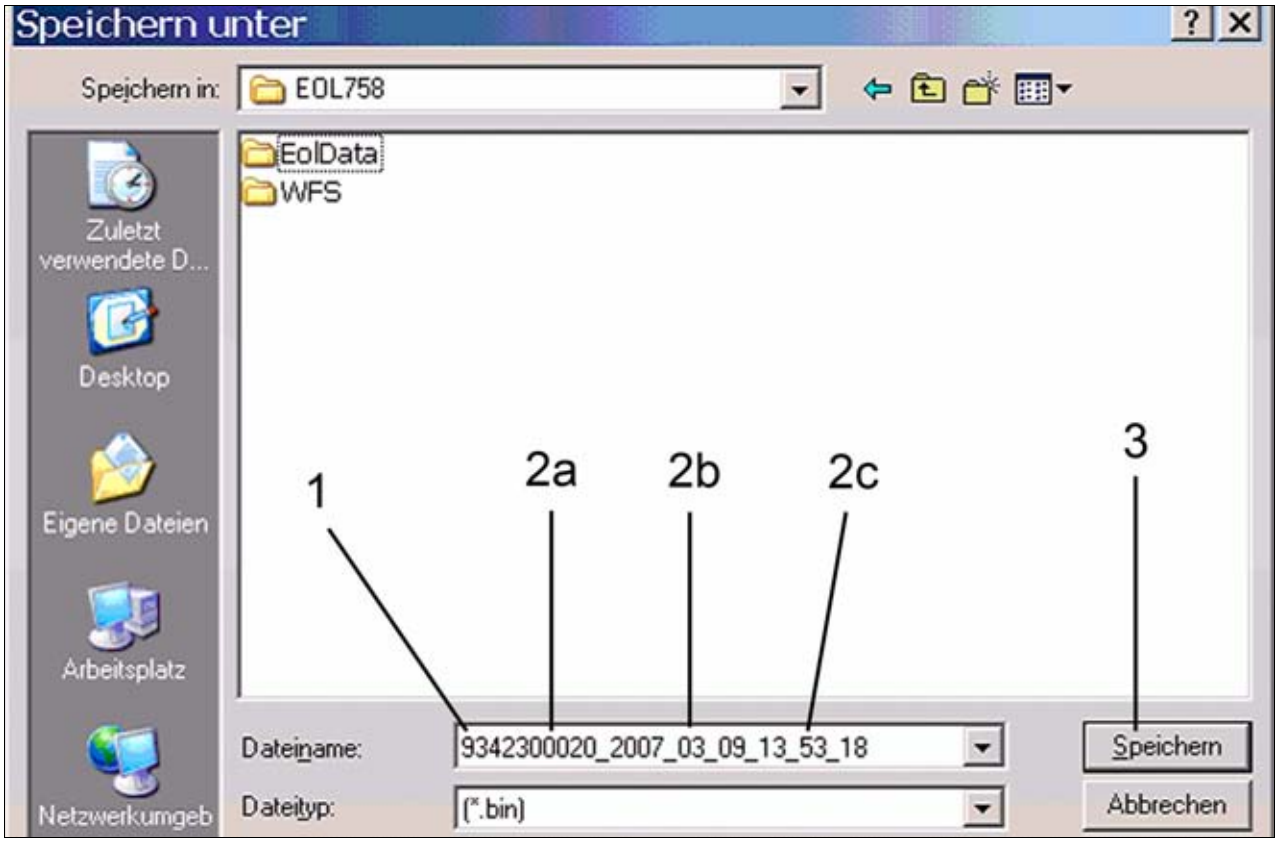


Fig. 17. I002272

The following "Save as" window opens up to save the activation package.

1. Copy the automatically generated file (please do not rename!) into a folder you will be able to find again, so that you can send the file via e-mail.
2. File name structure:
   a. Chassis number
   b. Activation package creation date
   c. Activation package creation time
3. Click "Save" to save the activation package.
   NOTE: *a) If several activation packages have already been created for this tractor, always send the most recent one to Fendt for activation purposes.*
   b) Please do not create several consecutive activation packages and send them to Fendt. This will cause the activation process for this tractor to be blocked!
4. The ongoing programming process can be monitored via several messages in the status line of the end-of-line program. The status message "Switch to normal mode" shows that the process is complete for now.
5. Tractor ignition OFF. Close the EOL program and send the generated activation package to Fendt via e-mail.

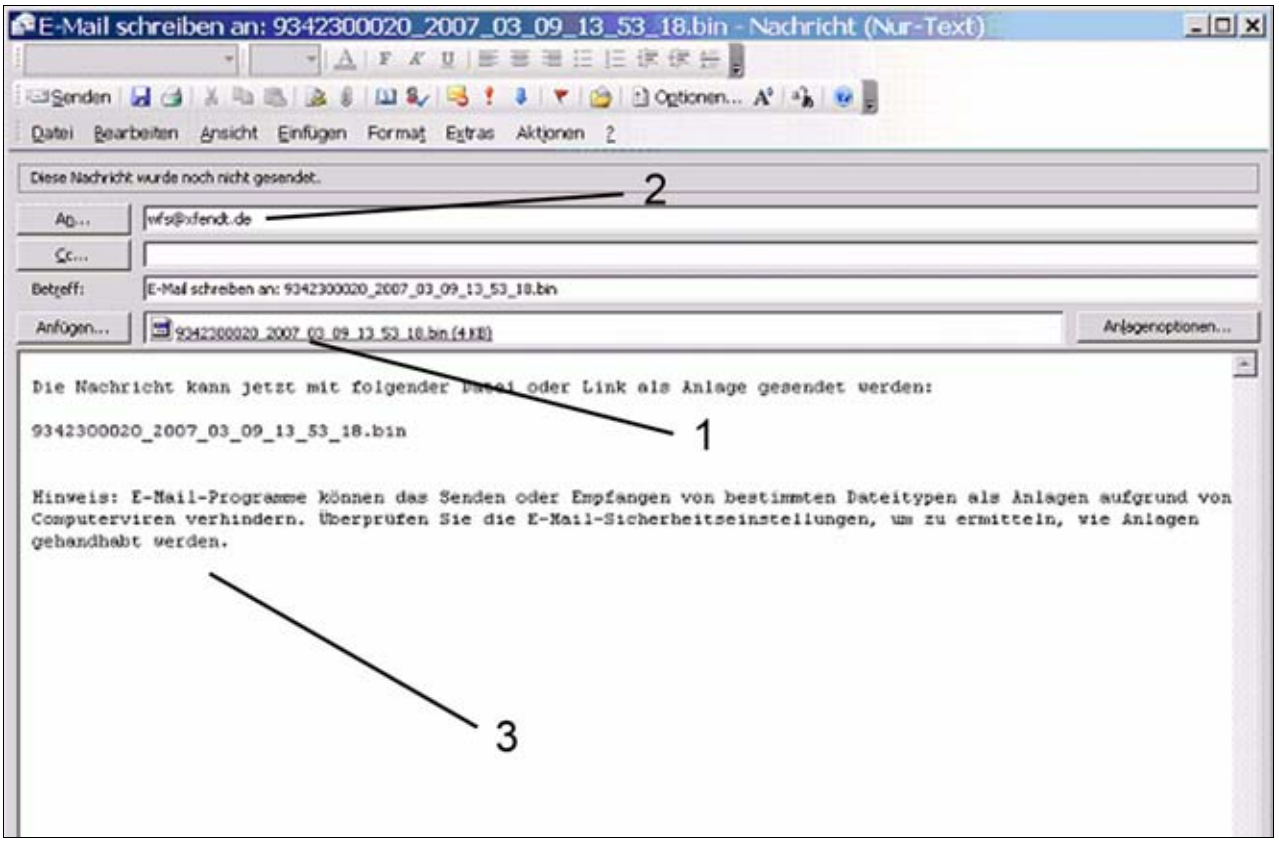


Fig. 18. I002273

1. Insert the activation package as an attachment to an e-mail
2. Send the e-mail to wfs@xfendt.de for activation. There is a 24-hour service available. However, we ask you to perform the activation during regular business hours.
3. Please add further information in the e-mail:
   a. Contact with complete workshop address and telephone number
   b. Supplementary sheet (information) indicating that the customer has been notified of the activation
   c. Chassis number
   d. Customer name with complete address
   e. Brief description as to why this activation is needed.

E-mail returned by Fendt with activation code for activation purposes:

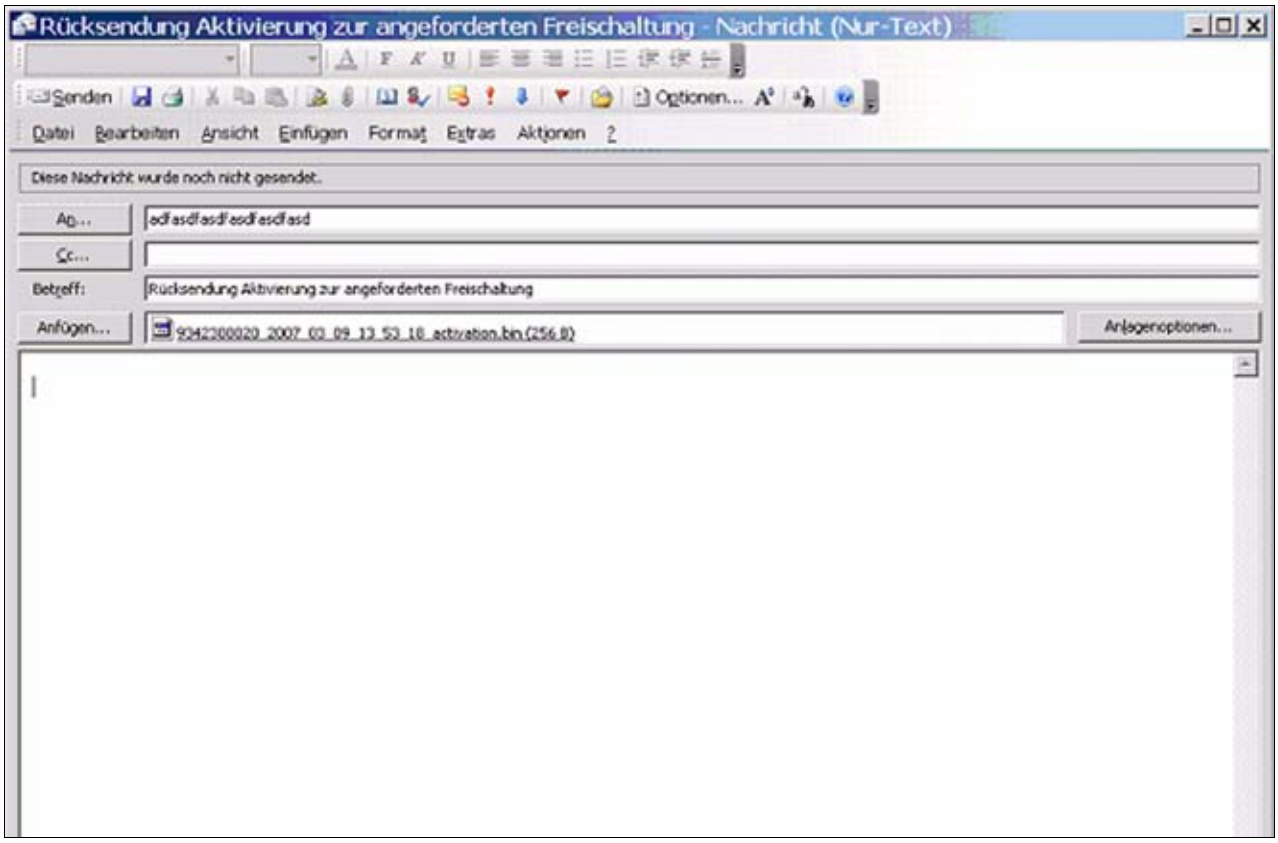


Fig. 19. I002274

Fendt strives to return the activation request in the shortest time possible.

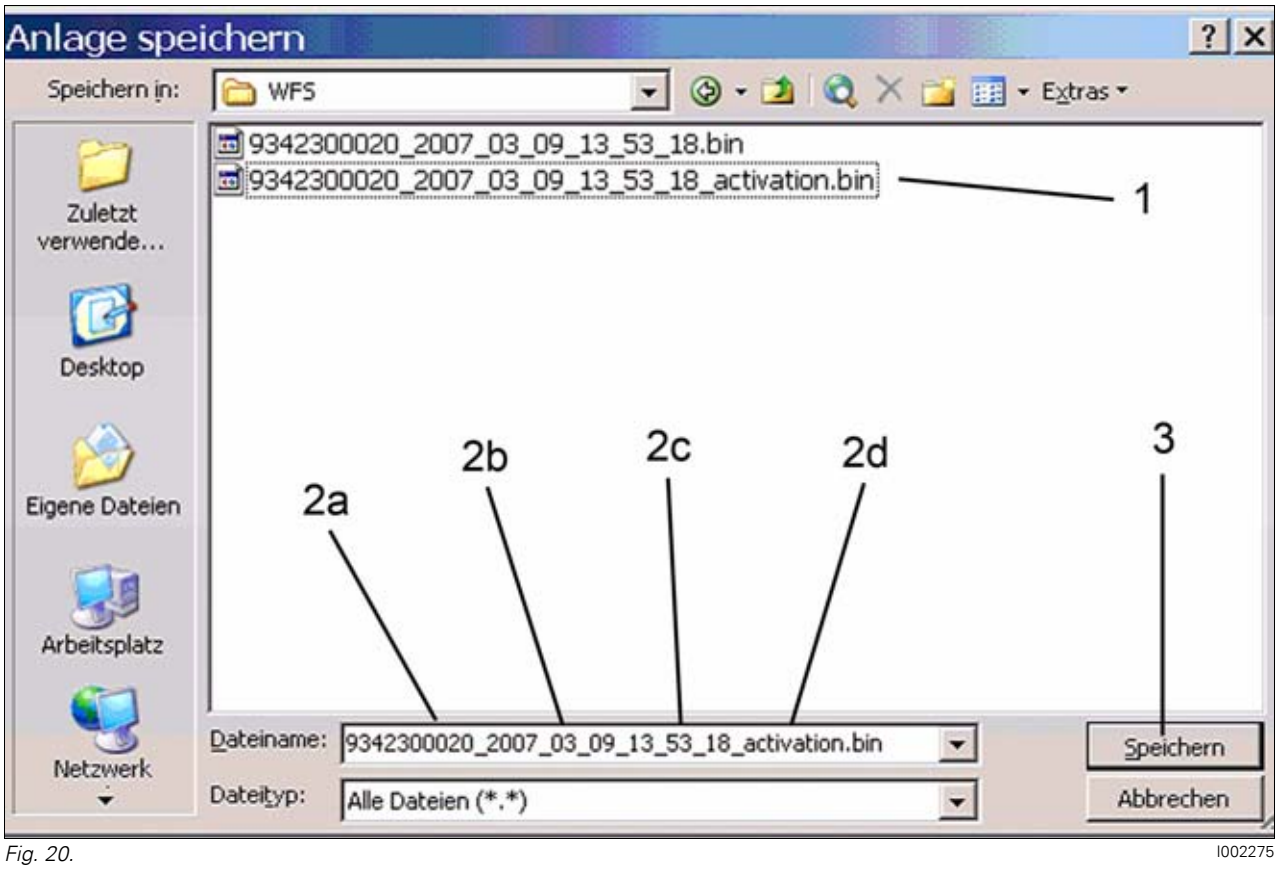


Fig. 20. I002275

1. Please copy the file returned by Fendt into the same directory folder as before. Please do not rename the file!
2. The structure of the file name is as before, except that the word "activation" has been added:
   a. Chassis number
   b. Same as activation package creation date
   c. Same as activation package creation time
   d. "activation" added
   –> Makes allocation easy
3. Click "Save" to save the activation package.

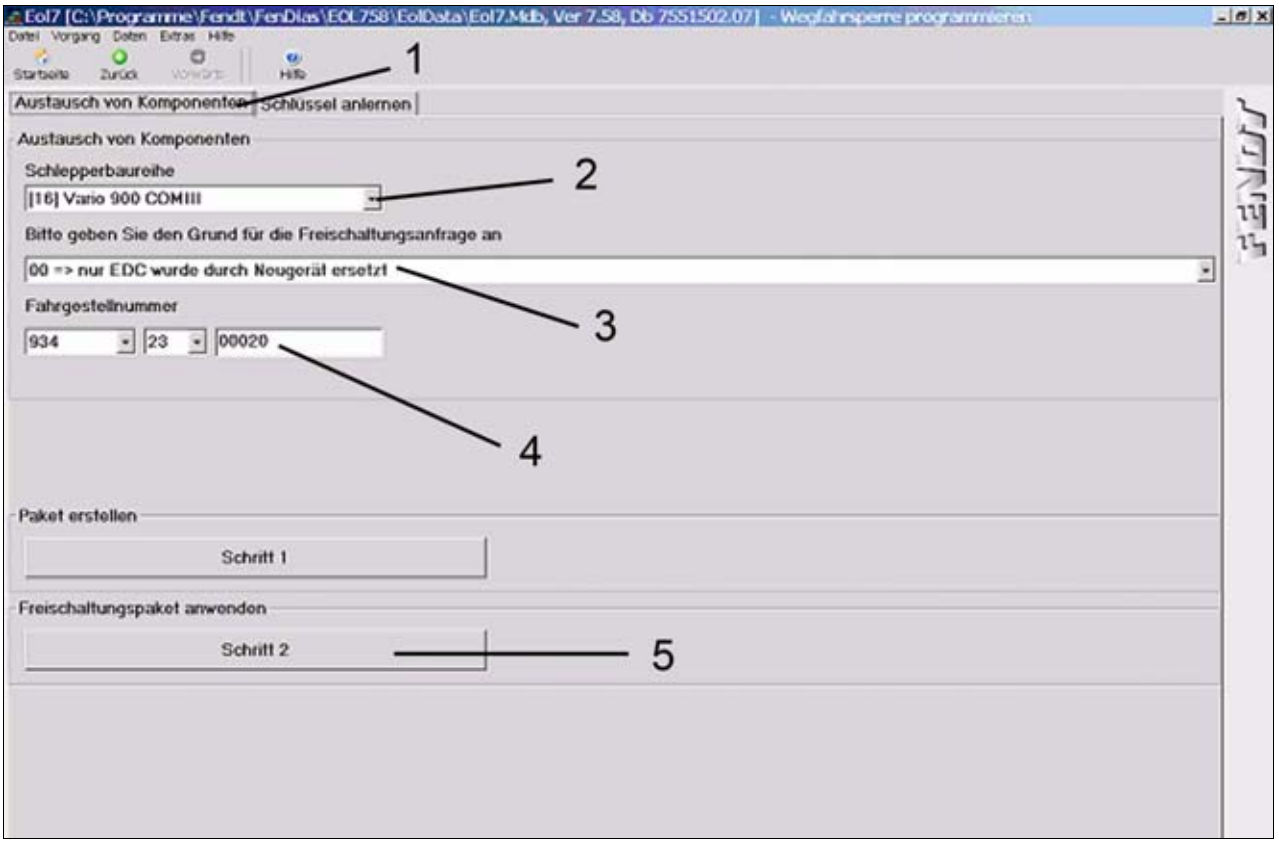


Fig. 21. I002278

Application back on the tractor:

1. Switch ignition ON again, start end-of-line program and go to "Exchange components" menu page.
2. Enter the correct tractor series, here "Vario 900 COMIII".
3. Correctly enter the item "Please enter the reason for the activation request" once more, as this is used to control the contents of the activation packages.
4. Make sure to enter the complete and correct chassis number.
5. Click "Apply activation package"

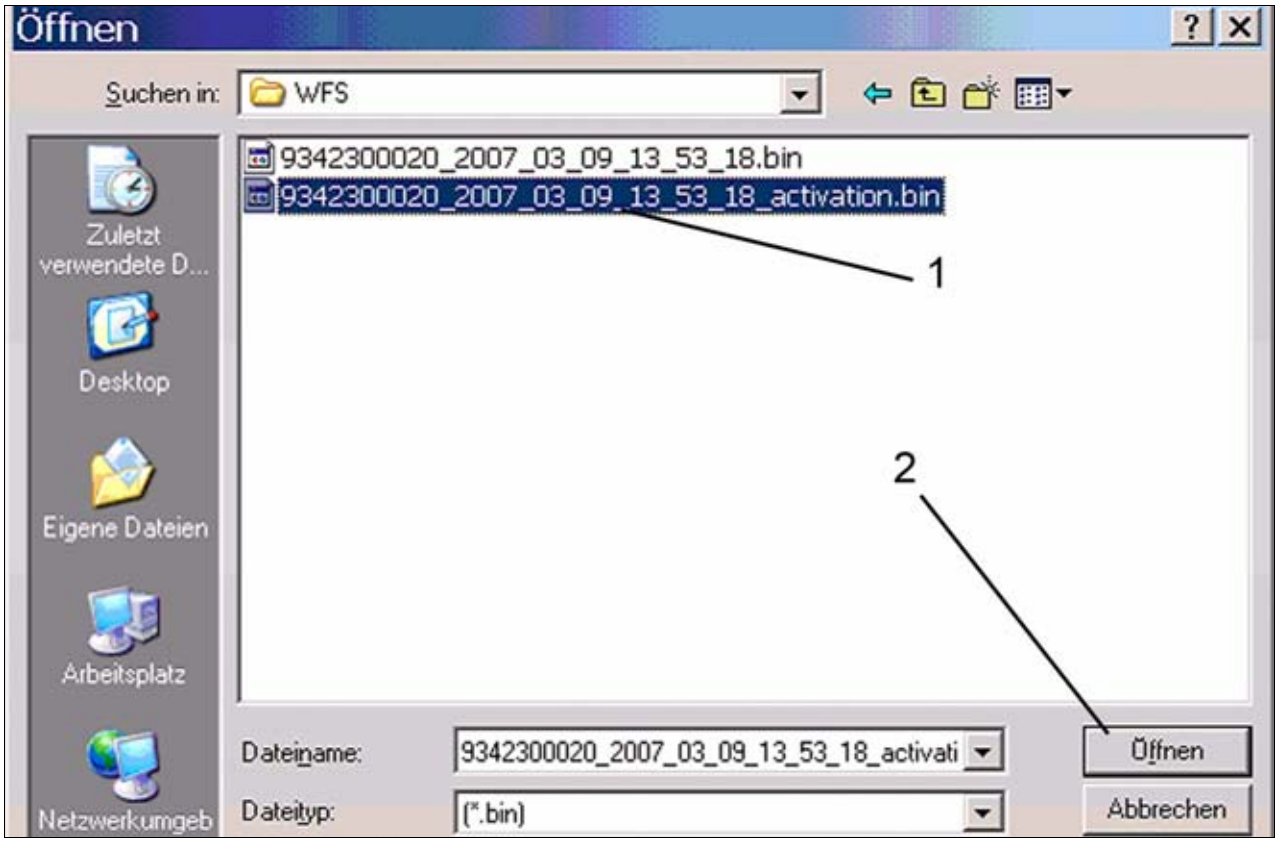


Fig. 22. I002279

1. Select activation file.
2. Select the correct file with the ending "..._activation.bin" and read in by clicking "Open".

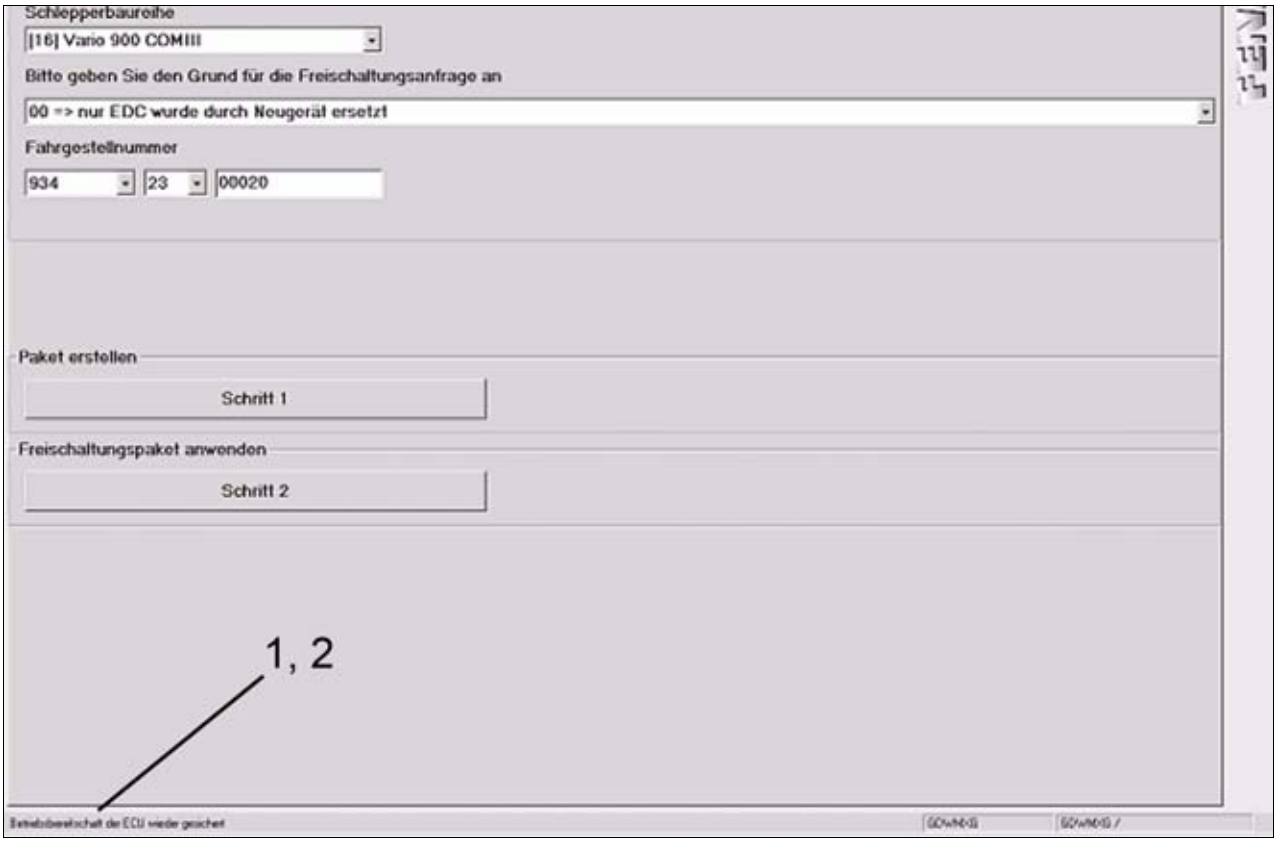


Fig. 23. I002280

The activation package is applied to the tractor

1. The ongoing programming process can be monitored via several messages in the status line of the end-of-line program.
2. The status message "Operability of ECU ensured" indicates that the process is complete.

Switch ignition OFF and wait for at least 15 seconds until the electronic components are released. After a restart ("cold start"), there should be no more immobiliser error codes and it should be possible to start the tractor as usual.

Any existing keys that were not taught in again during this process can no longer be used for this tractor

Delete error codes from the memory, perform a brief function check to make sure that everything is OK.