

Workshop Service Manual

FENDT 900 Vario - COM III

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-



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

FENDT

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

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 I d 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 I d 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 I d 2

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

Unkt I d 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)
9620	Hydraulic equipment/valve fitting
9700	Overall system/electronics
9920	Service/special tools
9975	Service/SERDIA - Deutz engine diagnostics program

A	General	9000 Overall system/electrical system	9000 Overall system/electrical system
B	Faults		
C	Documents and Diagrams		
D	Component location		
E	Testing		
F	Setting and Calibration		
G	Repair		
H	Service – Info		

9000 Overall system/electrical system

E	Measuring and testing	5

E Measuring and testing

1	A007 instrument panel	9
2	A009 actuator unit	17
3	A011 radar sensor (optional).	23
4	A013 PCB, microfuse	27
5	A036 control panel, right/left instrument panel	32
6	A038 function; +supply; control bus	37
7	A038 driving light, position light, direction indicator.	45
8	A038 horn, rotating beacon, wide vehicle marker	50
9	A038 work light	52
10	A038 interior lighting	55
11	A038 wipers, rear window heater, mirror heater	57
12	A038 automatic air conditioning system	61
13	A038 sockets	67
14	A038 starter, tank pump.	70
15	A038 - "Rüfa" reverse drive control.	73
16	Test A038 with 160-pin adapter box	75
17	A039 multifunction armrest (MFA) and driver seat	76
18	Test A039 with 160-pin adapter box	82
19	A050 +supply	83
20	A050 CAN bus connection	88
21	A050 hydraulics protection and supply (working and steering hydraulics).	95
22	A050 rear power lift EPC and rear power lift additional functions	103
23	A050 electr. auxiliary control valves Bosch SB23 EHS 2	113
24	A050 standard front power lift	116
25	A050 front power lift enhanced control	118
26	A050 front axle suspension – 1-circuit brake system.	122
27	A050 front axle suspension – 2-circuit brake system.	126
28	A050 "HZW" rear PTO.	131
29	A050 front PTO	135
30	A050 4WD and differential lock (front and rear).	137
31	A050 Vario transmission control.	140
32	A050 brake	152
33	A050 ECU, basic control unit (area: Autoguide "auto steering assist system")	156
34	Test A050 with 160-pin adapter box	165
35	A051 ECU, EDC engine control unit (pin assignment)	166
36	A051 ECU, EDC engine control unit, "Engine controller"	168
37	Test A051 with 160-pin adapter box	179
38	A053 air conditioning unit (stepless fan)	180
39	A053 air conditioning unit (sensor, evaporator)	182
40	A053 air conditioning unit ("Stepper" heater valve).	184
41	A055 ECU, Vario-Doc	186
42	A058 Autoguide TopDock (receiver unit)	196
43	A059 Autoguide terminal	205
44	A060 Handsfree system for mobile phone	209
45	B002 sensor, front PTO speed.	214
46	B004 vacuum switch (air filter).	217
47	B008 sensor, high pressure 1	220

48	B009 sensor, discharge temperature	223
49	B010 sensor, engine speed.	226
50	B013 hydraulic oil temperature sensor	229
51	B014 sensor, hydrostatic collecting shaft	233
52	B015 sensor, bevel pinion	236
53	B016 sensor, travel range detection	239
54	B017 sensor, clutch pedal	242
55	B019/B060 compressed air supply sensor	245
56	B020 sensor, rear PTO speed (stub shaft)	250
57	B021 sensor, rear PTO speed (clutch).	253
58	B030 sensor, rear power lift position	256
59	B031/B032 right/left draught sensing pin	259
60	B034 immersed tube sensor (fuel)	262
61	B039 sensor, high pressure 2	265
62	B040 front power lift position sensor (for front power lift enhanced control only)	268
63	B055 sensor, foot throttle	271
64	B019/B060 compressed air supply sensor	275
65	B063 filter contamination pressure switch (hydraulic circuit)	280
66	B066 left wheel position sensor	283
67	B067 sensor, steering angle	286
68	B068 right wheel position sensor	289
69	B071 output temperature sensor	293
70	B073 sensor, solar (heat insolation)	295
71	B074 sensor, interior temperature	298
72	B076 exterior temperature sensor	301
73	B077 control, engine fan (speed sensor/magnetic clutch)	303
74	B081 steering wheel sensor (360°).	306
75	B083 immobiliser control unit	309
76	B084 sensor, hydraulic oil level	312
77	B085 sensor, camshaft speed.	315
78	B086 rail pressure sensor	319
79	B087 fuel low pressure sensor	322
80	B088 sensor, crankshaft speed.	325
81	B089 coolant temperature sensor.	329
82	B090 engine oil pressure sensor.	333
83	B091 water in fuel sensor	336
84	B092 boost pressure/charge air temperature sensor	338
85	E - work light (XENON)	343
86	EU control device (digital tachograph).	346
87	E063 heater element (air dryer).	351
88	G001 battery / K068 battery disconnect relay	353
89	G002 / G004 alternator right/left	358
90	M001 starter	361
91	M002 front wiper motor	365
92	M003 / M005 front/rear wiper pump.	368
93	M004 wiper motor, rear	371
94	M010 fuel pump	374
95	M017 primary fan	376
96	R002 heater flange	378
97	S005/S006 right/left brake switch	381
98	S017 filter contamination switch.	384
99	S019/S020 left/right rear PTO button (external)	387
100	S021/S022 front power lift raise/lower button (external)	390
101	S025 pressure monitor control pump switch	393
102	S026 steering pump flow monitor switch.	396

103	S027/S028/S029/S030 rear power lift button (external)	400
104	S034 coolant level switch.	403
105	S045 switch, reverse operation positioning	406
106	S047 switch, engine brake	409
107	S067/S068 button, valve actuation raise/lower (external)	411
108	S075 switch, guard rail pump flow monitor	414
109	S079 steering column/quick reverse switch (area: quick reverse)	418
110	S079 steering column/quick reverse switch (area: steering column)	421
111	S080 switch, hand brake	424
112	S085 switch, reverse operation (recognition: steering column, top)	427
113	S086/S087 right/left brake wear switch	429
114	X007 implement socket "black"	432
115	X008 counter input (onboard computer) "blue".	435
116	X015 external control, rear EPC (external position sensor)	437
117	X015 external control (range: 3rd and 4th hydraulic circuit) (professional version only)	439
118	X015 external control socket (area: steering axle automatic mode).	441
119	X017 front socket (with front power lift only).	451
120	X018 trailer socket	452
121	X028 ISO BUS implement socket (in cab)	453
122	X400 ISO BUS PCB (implement socket)	456
123	X1048 ABS socket (anti-lock system on trailer)	460
124	Y002/Y003 solenoid valve, travel range I/II.	462
125	Y004 turbo clutch solenoid valve	466
126	Y005 speed governor solenoid valve	469
127	Y008 solenoid valve, rear PTO (clutch).	471
128	Y009 4WD solenoid valve	474
129	Y010 solenoid valve, differential lock	477
130	Y011 front PTO clutch solenoid valve	480
131	Y012 charging solenoid valve	483
132	Y021/Y022 raise/lower solenoid valve (standard front power lift)	486
133	Y021 lock valve, front pressure compensator	489
134	Y022 solenoid valve, field pressure control (front)	492
135	Y024 magnetic clutch, air conditioning compressor.	495
136	Y026/Y027 solenoid valve, rear PTO stage 540 (540E) / 1000	498
137	Y032 control pressure solenoid valve.	501
138	Y053 active hold function solenoid valve	504
139	Y055 lock valve, rear pressure compensator	507
140	Y060/Y061 solenoid valve, rear/middle hydraulic oil pre-heater	510
141	Y062 solenoid valve, field pressure control (rear).	514
142	Y063 wobble stabiliser solenoid valve	517
143	Y064 solenoid valve, suspension load pressure/lowering	520
144	Y065 raise suspension solenoid valve	523
145	Y067 lock suspension solenoid valve	526
146	Y070 EPC cut-off valve (front power lift enhanced control)	530
147	Y071/Y072 auxiliary control valve, middle	533
148	Y074/Y075/Y076/Y078/Y079/Y080 rear auxiliary control valve	536
149	Y077 EPC cut-off valve (rear power lift)	539
150	Y082/Y083-Solenoid valve, lower link stabiliser, lock/release	542
151	Y084 control pressure increase solenoid valve	545
152	Y085 solenoid valve, pilot pressure/switch-off (Auto-Guide)	548
153	Y086 solenoid valve, steering disconnect (Auto-Guide).	551
154	Y087 steering valve block, Auto-Guide.	554
155	Y091 dispensing unit (fuel).	556
156	Y092/Y093 solenoid valve, reverse drive control (Rüfa)	559

157	Y094 exhaust gas recirculation actuator motor	563
158	Y095 to Y098, Y100, Y101 - injectors 1 to 6	566

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

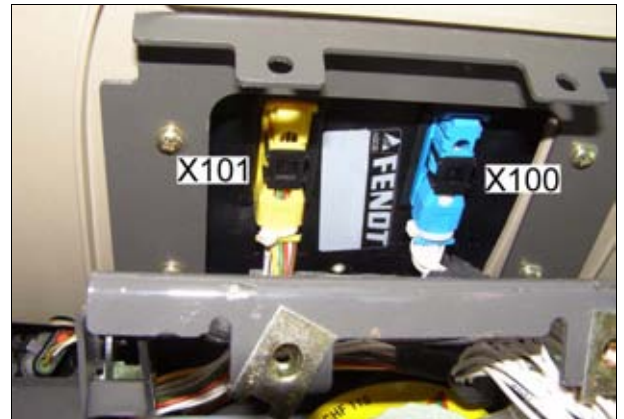
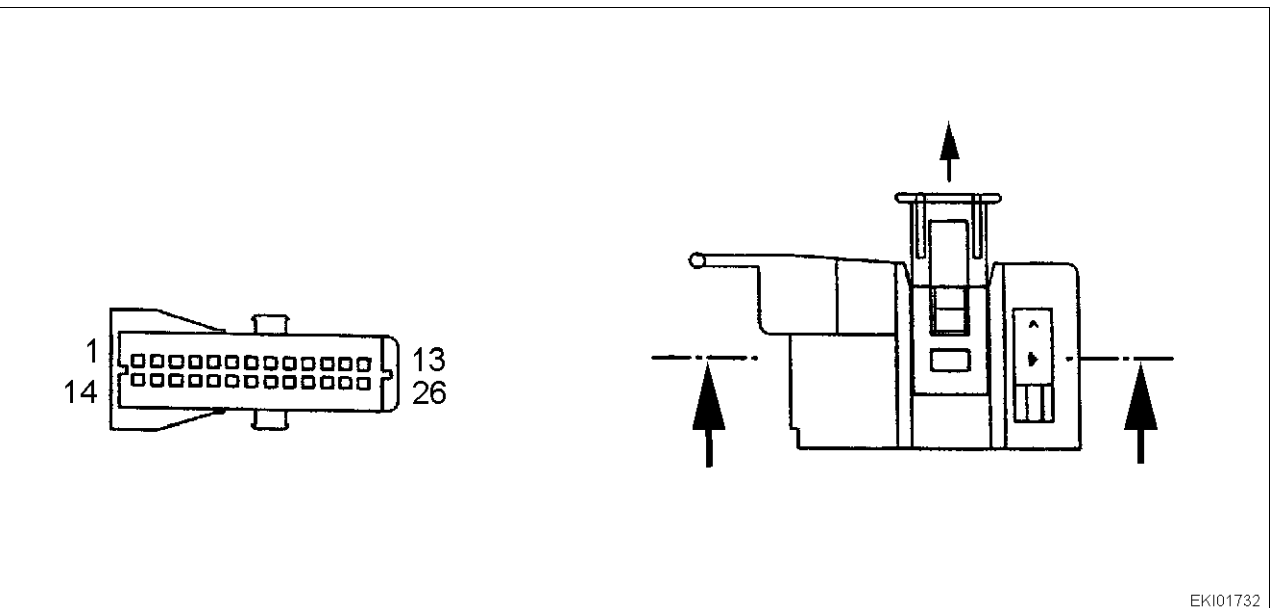


Fig. 1.

I001226



EKI01732

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).

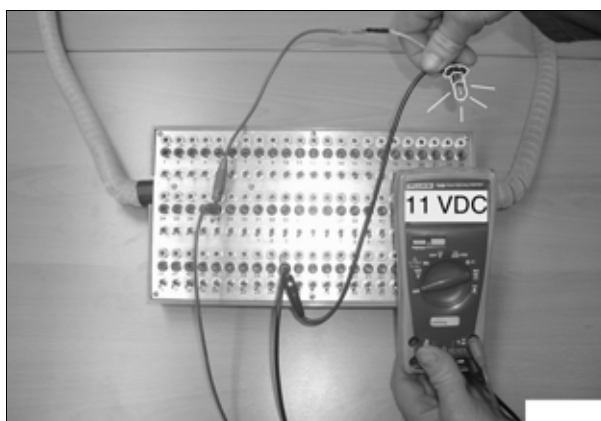


Fig. 3.

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 $\pm 10\%$

Pin	description	condition	Signal Specified value	Wire interrupted	
				Signal from ECU	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	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	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	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 $\pm 10\%$

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

Pin	description	condition	Signal Specified value	Wire interrupted	
				Signal from ECU	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.

1002363

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.

1002360

The transmission position (arrow) can be observed via the diagnostics program (FENDIAS).

The adjustment angle of any fault occurring can be detected

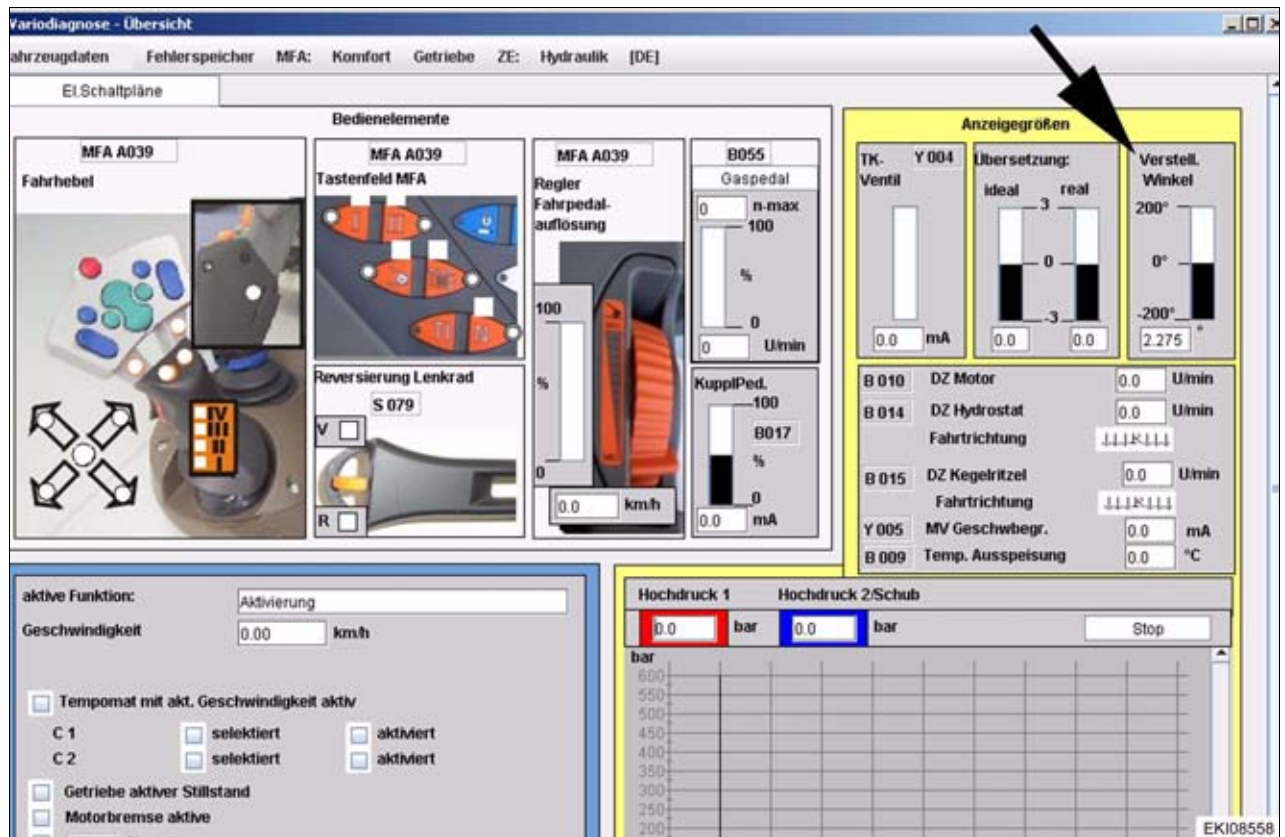


Fig. 9.

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)

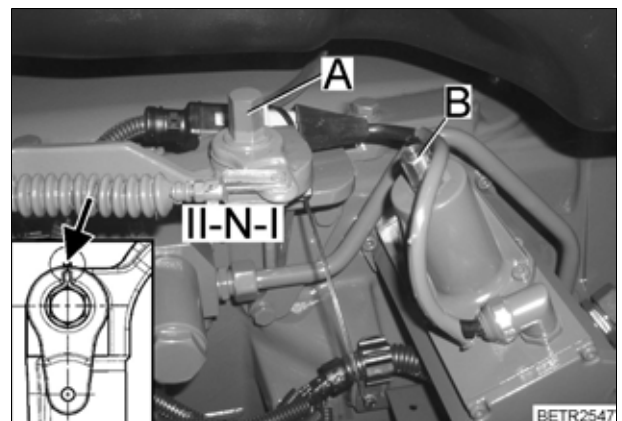


Fig. 10.

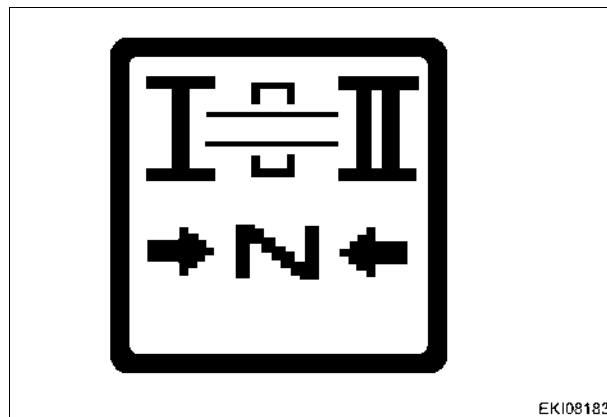
I002364

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



EKI08183

1001009

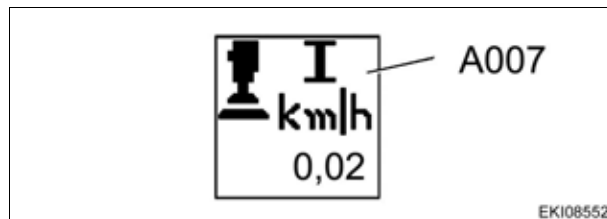
Fig. 11.

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

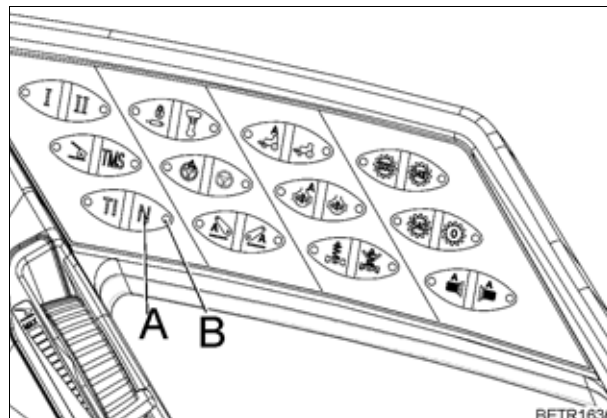


EKI08552

1002365

Fig. 12.

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



BETR1636

1000686

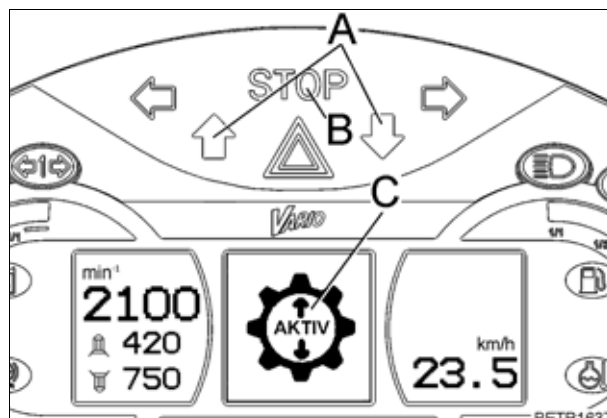
Fig. 13.

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



BETR1637

1000687

Fig. 14.

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

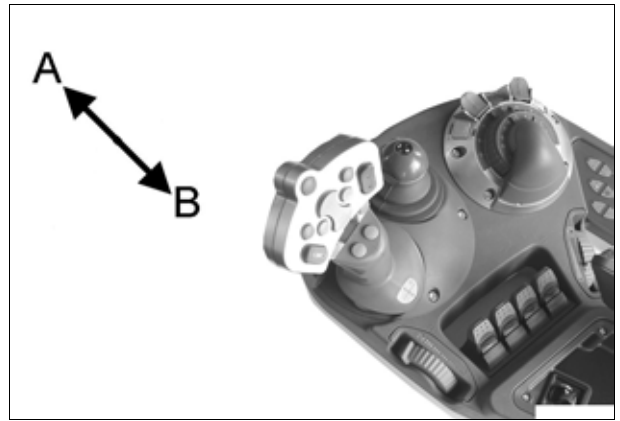
NOTE: The transmission ratio can be viewed on the terminal
[see §10](#)**Check voltage:****Setpoint value during the adjustment operation:**
constant. 14 VDC

Fig. 15.

I002366



Fig. 16.

I002366

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.

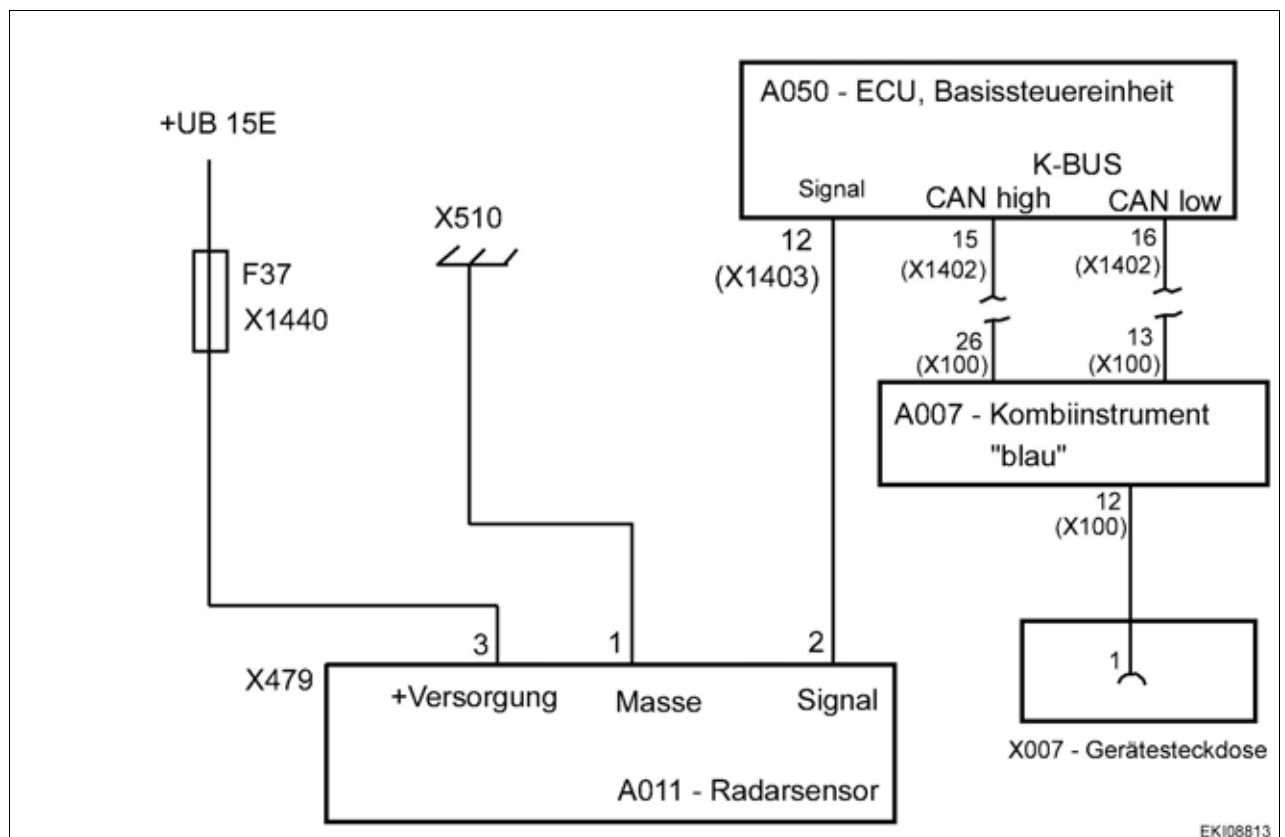
EK108814
I002938Circuit diagram: **A011** - Radar sensor

Fig. 19.

EK108813

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.

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

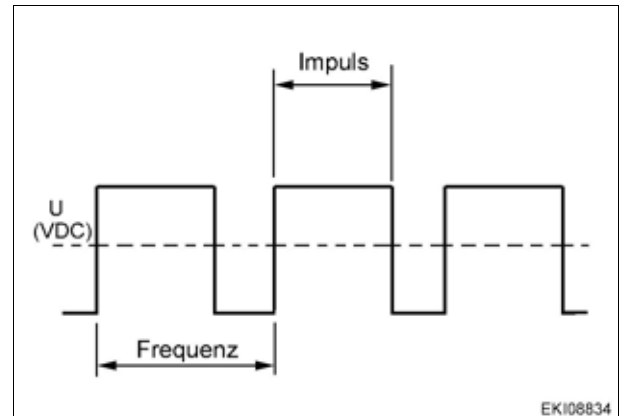


Fig. 22.

EKI08834

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)

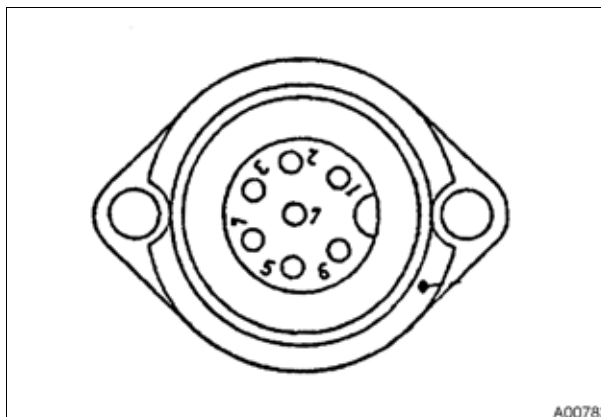


Fig. 24.

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

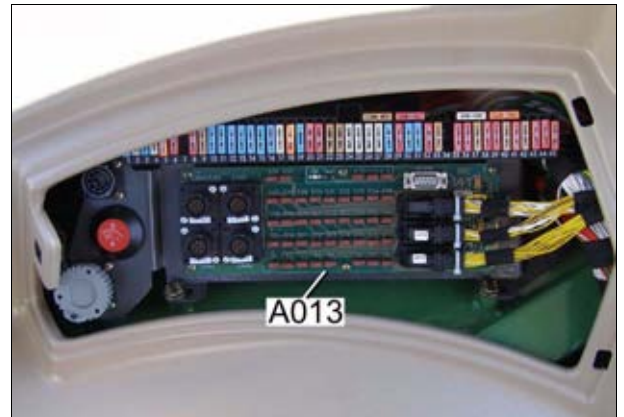


Fig. 25.

I001142

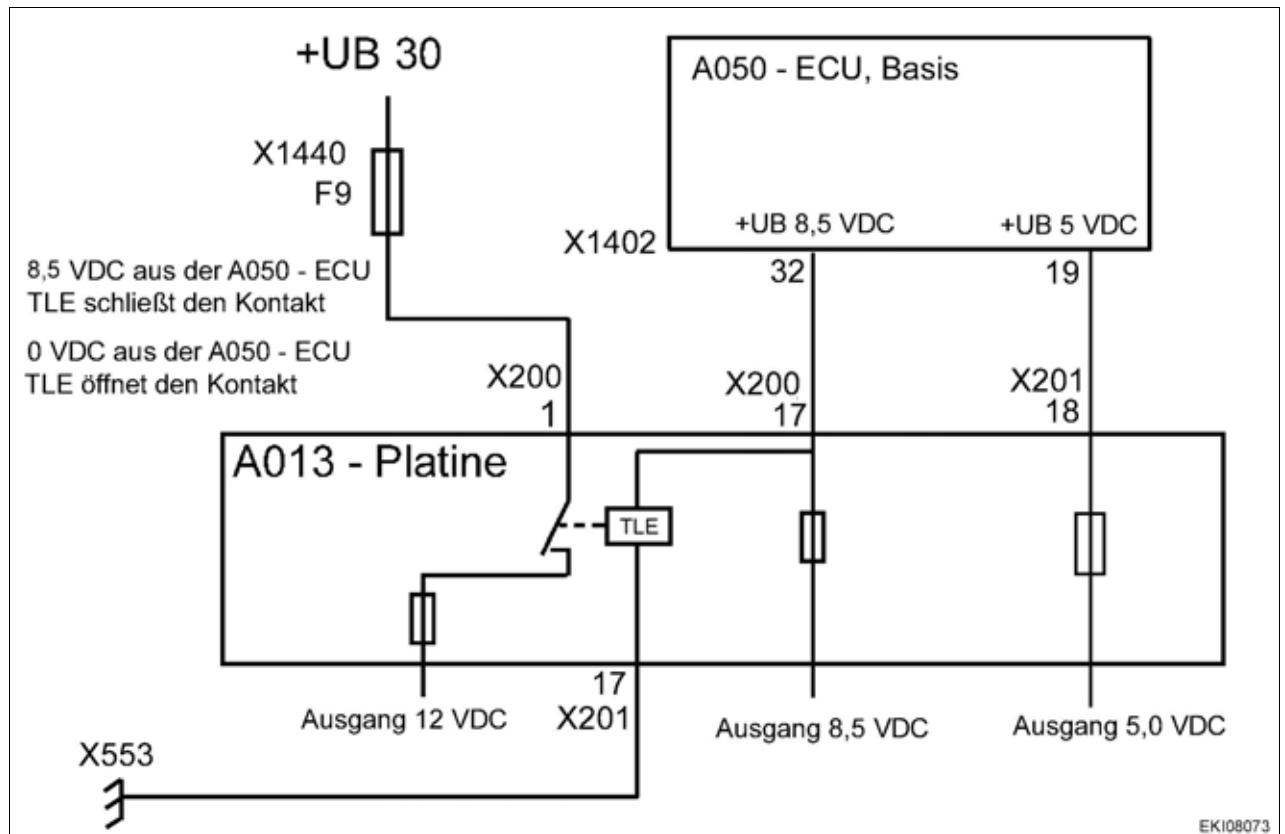


Fig. 26.

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).

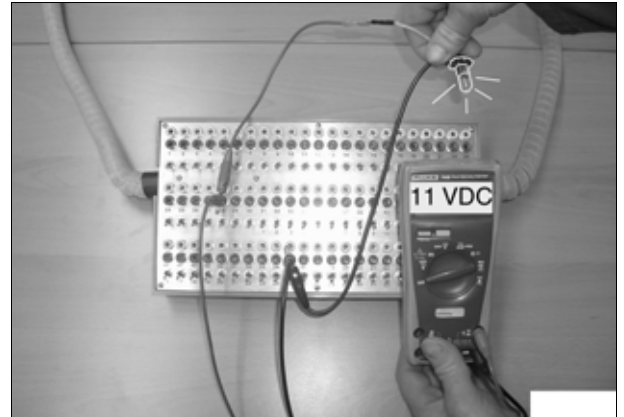


Fig. 27.

1000586

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

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. 28. 1007383



Fig. 29. 1002343

Circuit diagram A036 (A037) dashboard

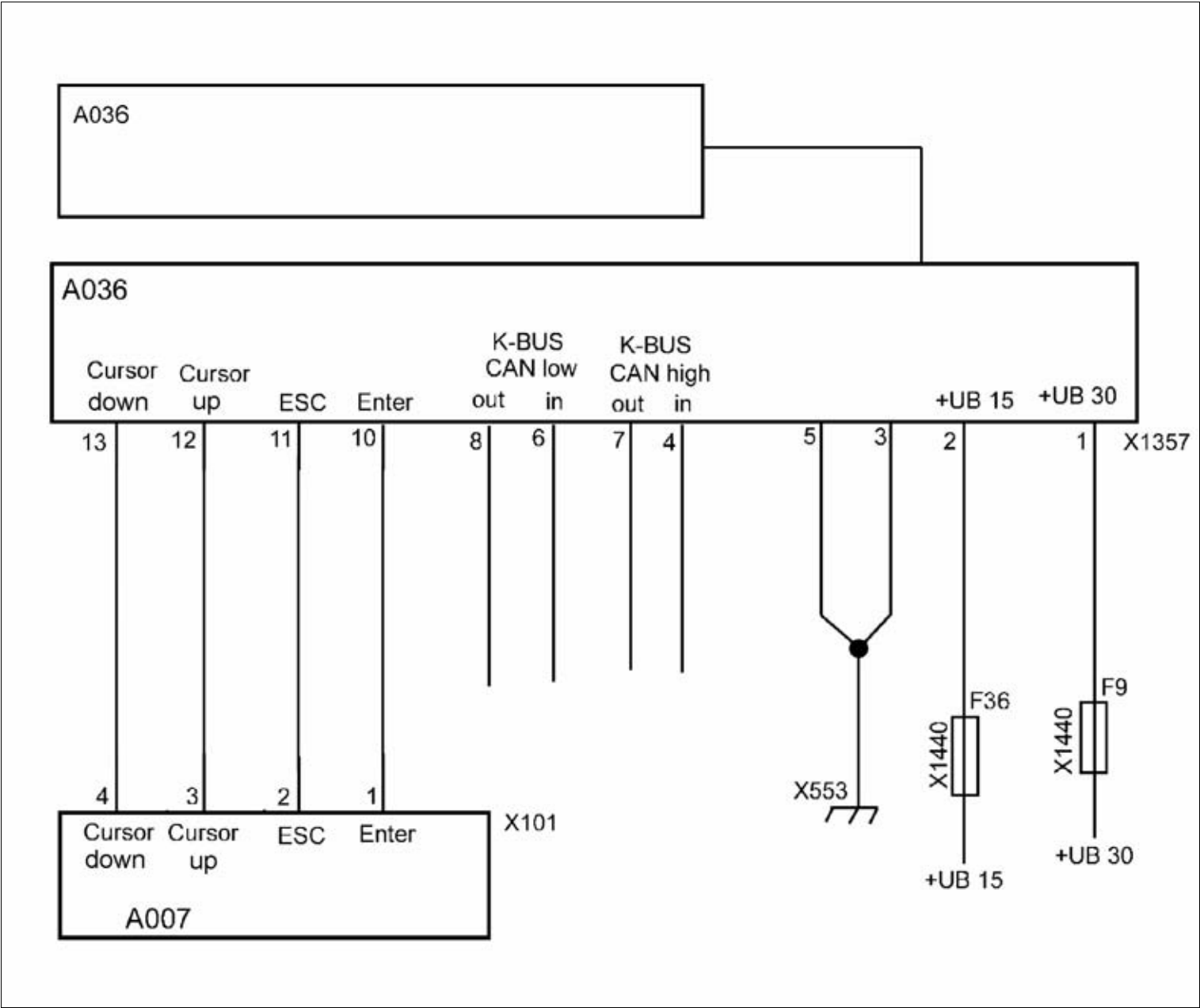


Fig. 30.

1007382

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-

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)

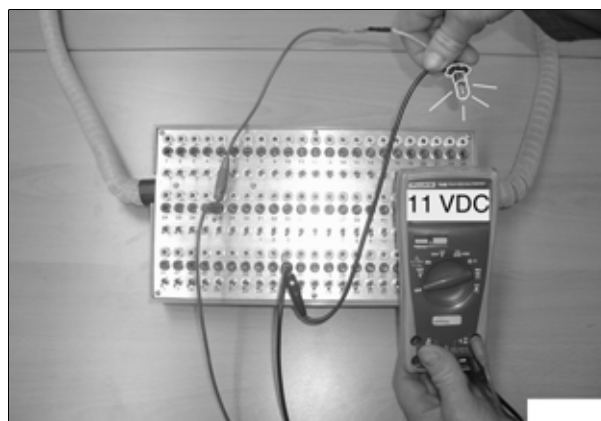


Fig. 31.

1000586

Pin assignment and signal values

NOTE: All readings +/- 10%

Pin	description	condition	Signal Specified value	Wire interrupted	
				Signal from ECU	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

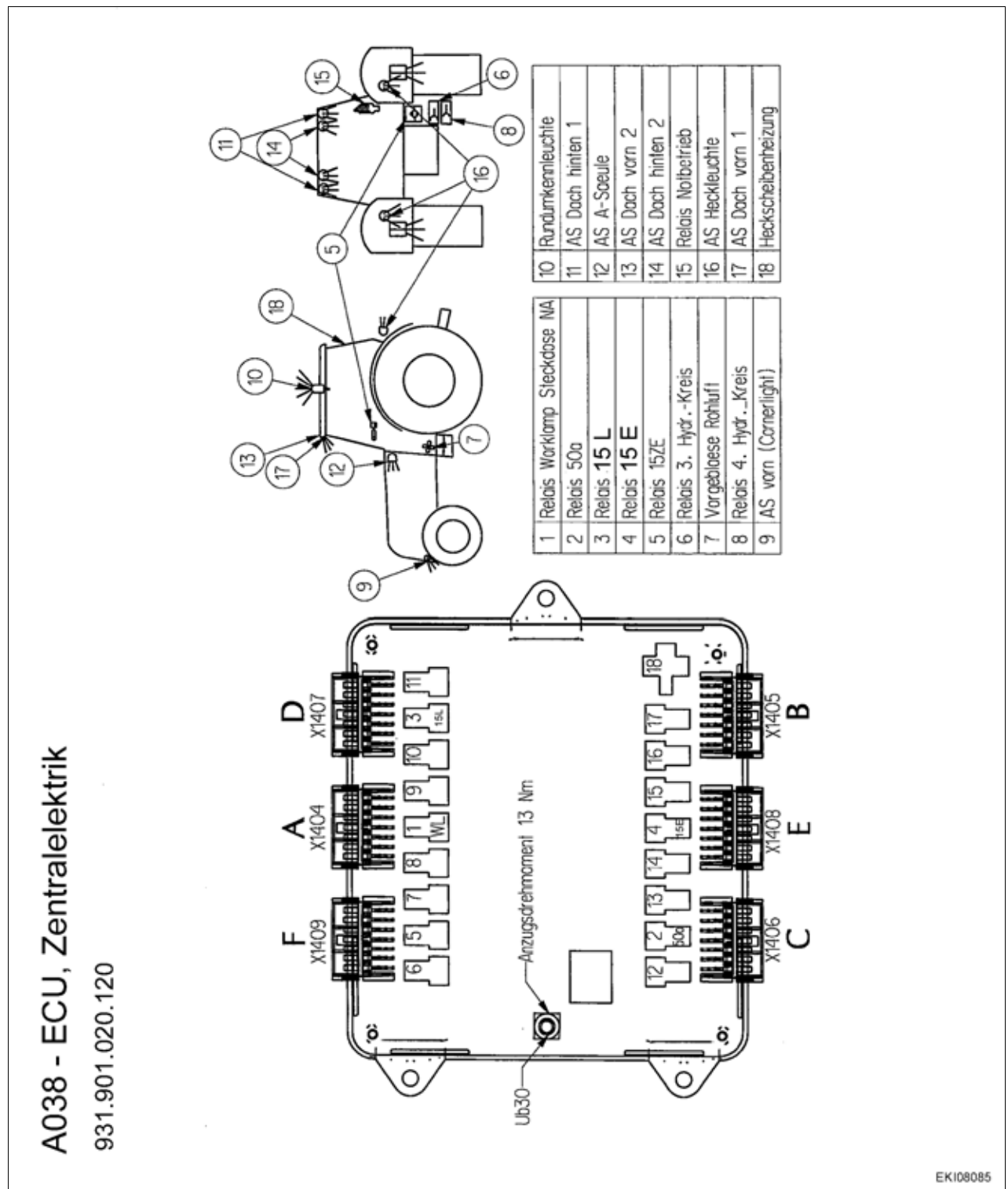
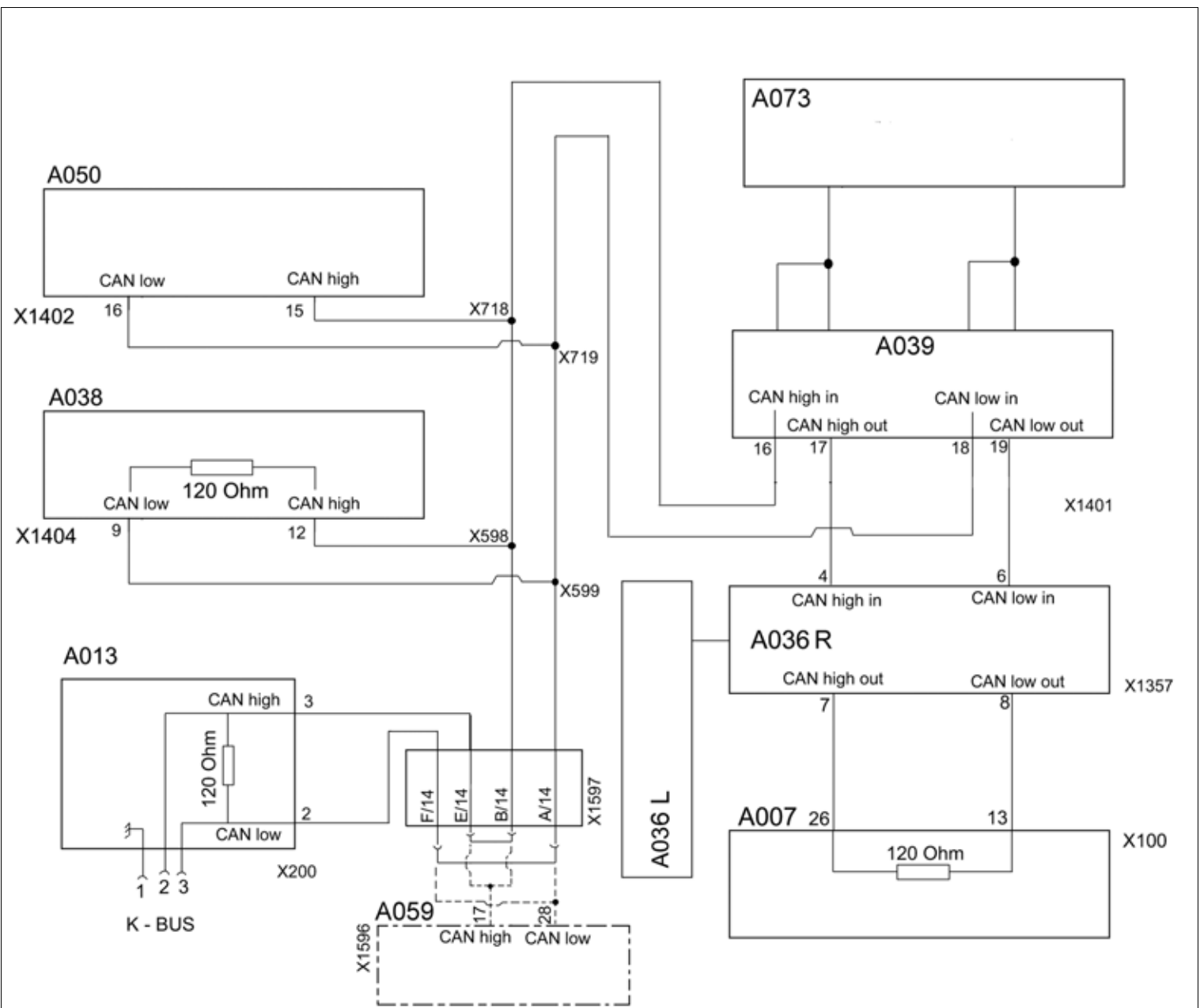


Fig. 32.

1001997

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)



1007392

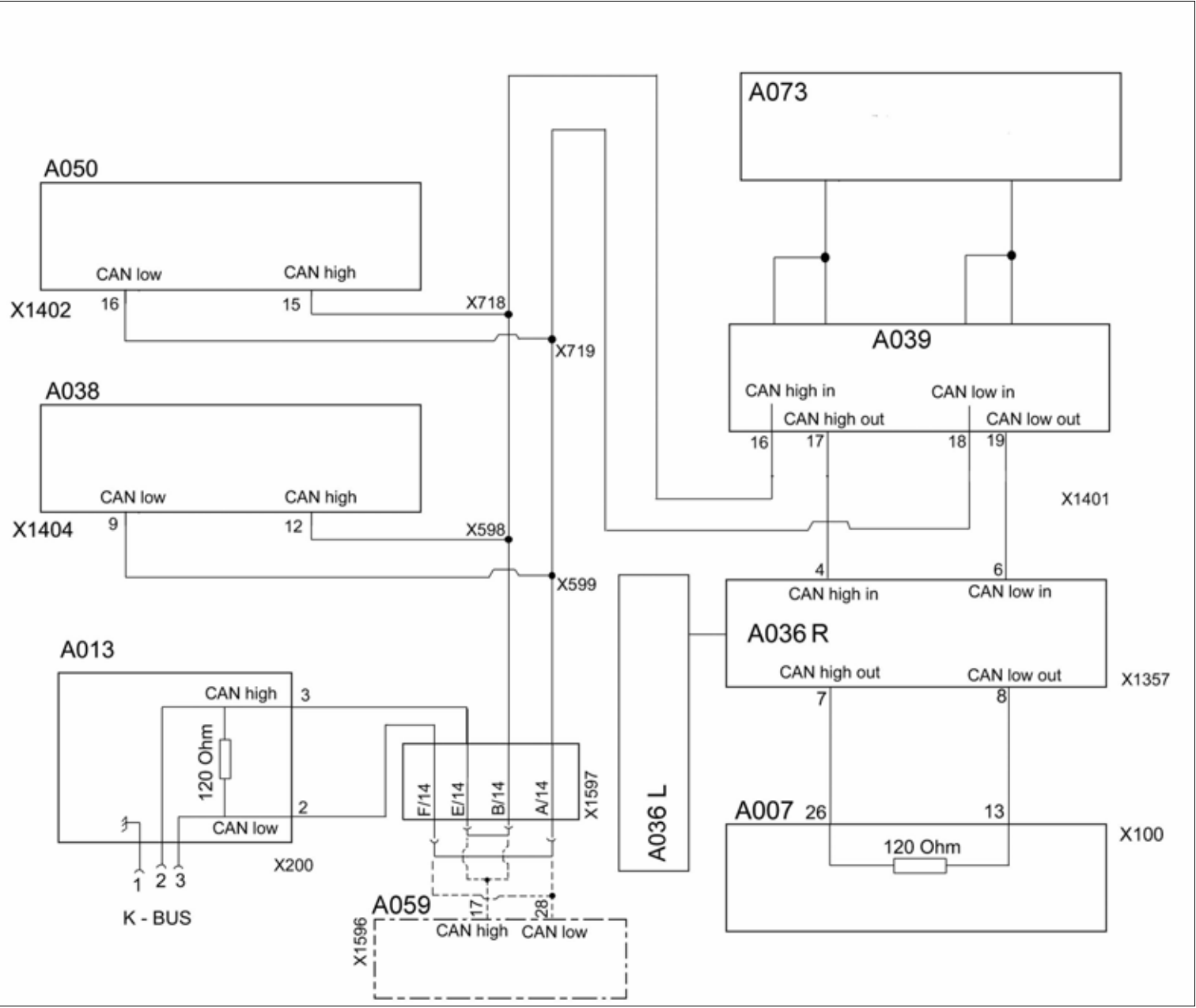


Fig. 34. Control bus, version B (from 9././1701)

1007393

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

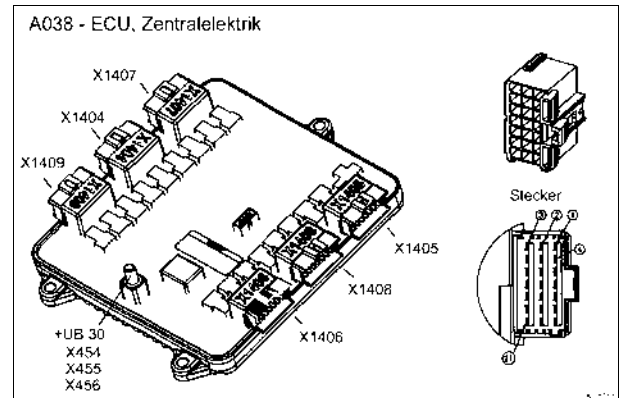


Fig. 35.

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 component
+ 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		

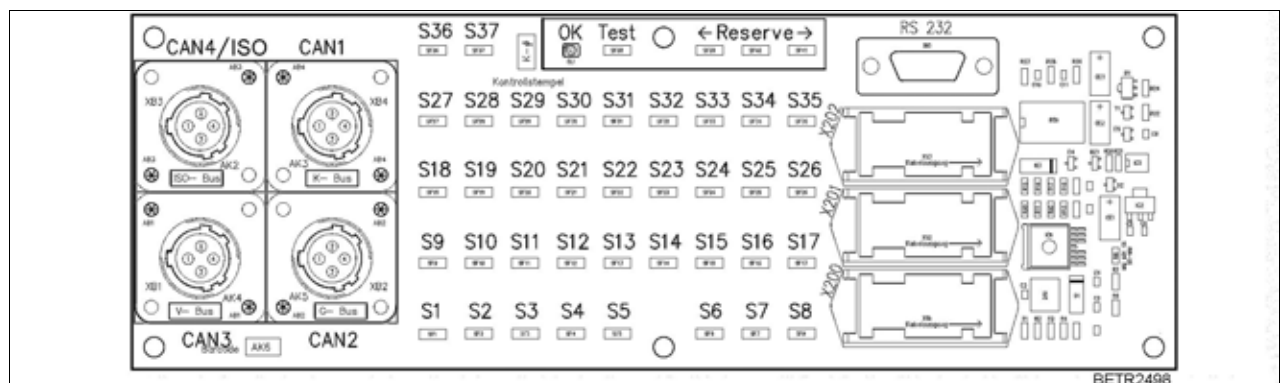


Fig. 37.

I002329

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-

T000783
Version 3
07-09-2009

43

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

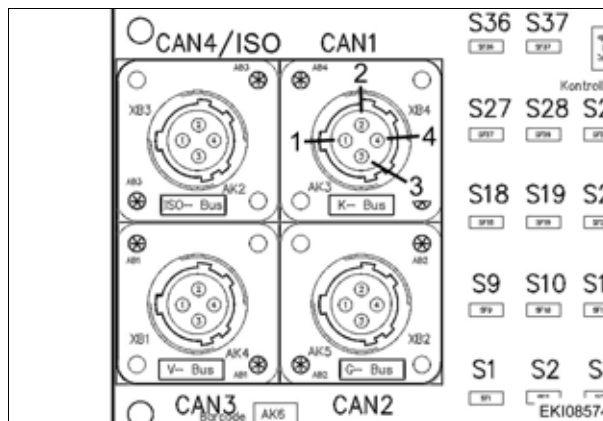


Fig. 38.

7 A038 driving light, position light, direction indicator

Circuit diagram: driving light, position light, direction indicator

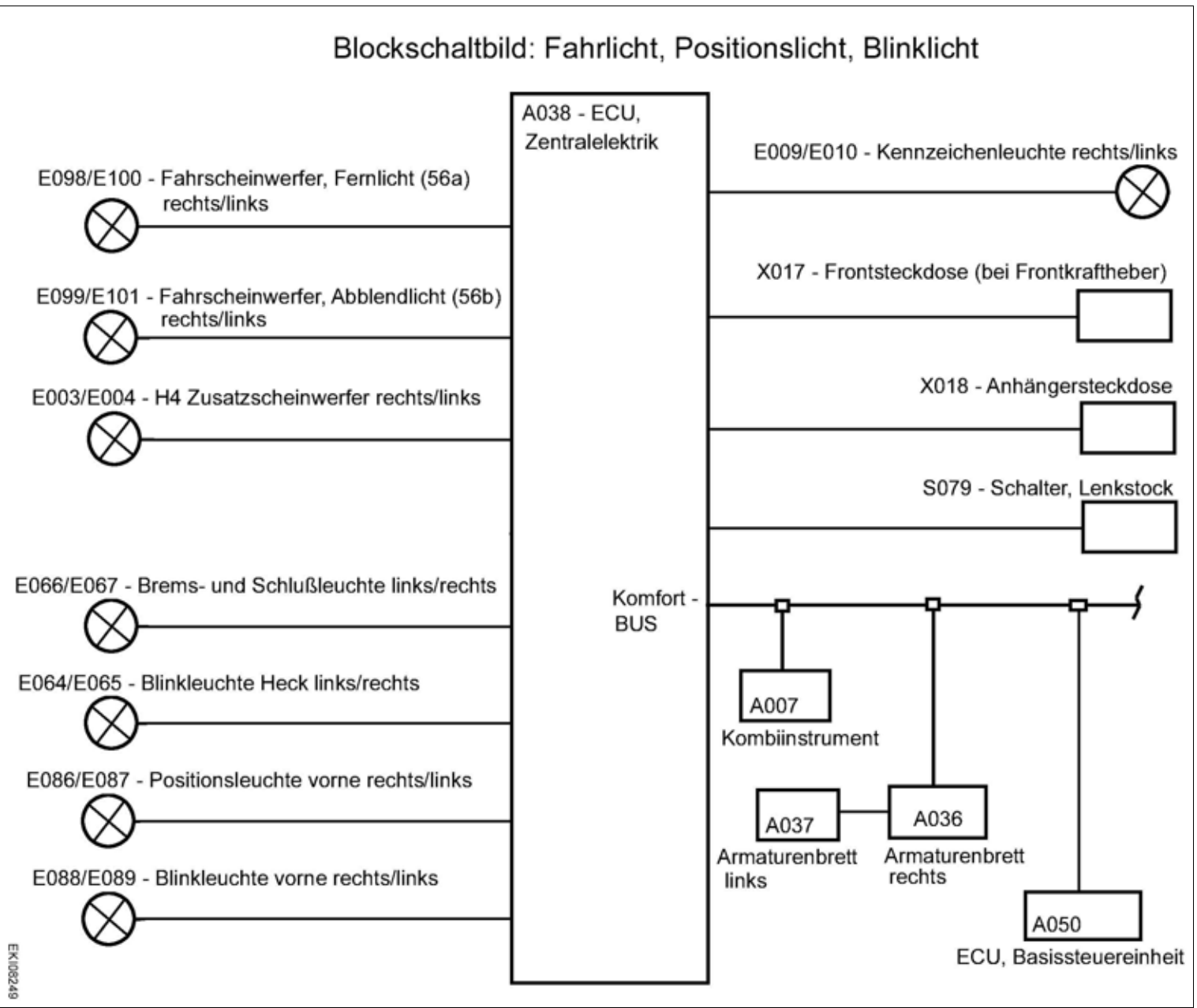


Fig. 39.

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](#)

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



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: 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 intermittent	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 intermittent	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 component
		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
		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 loadable	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)

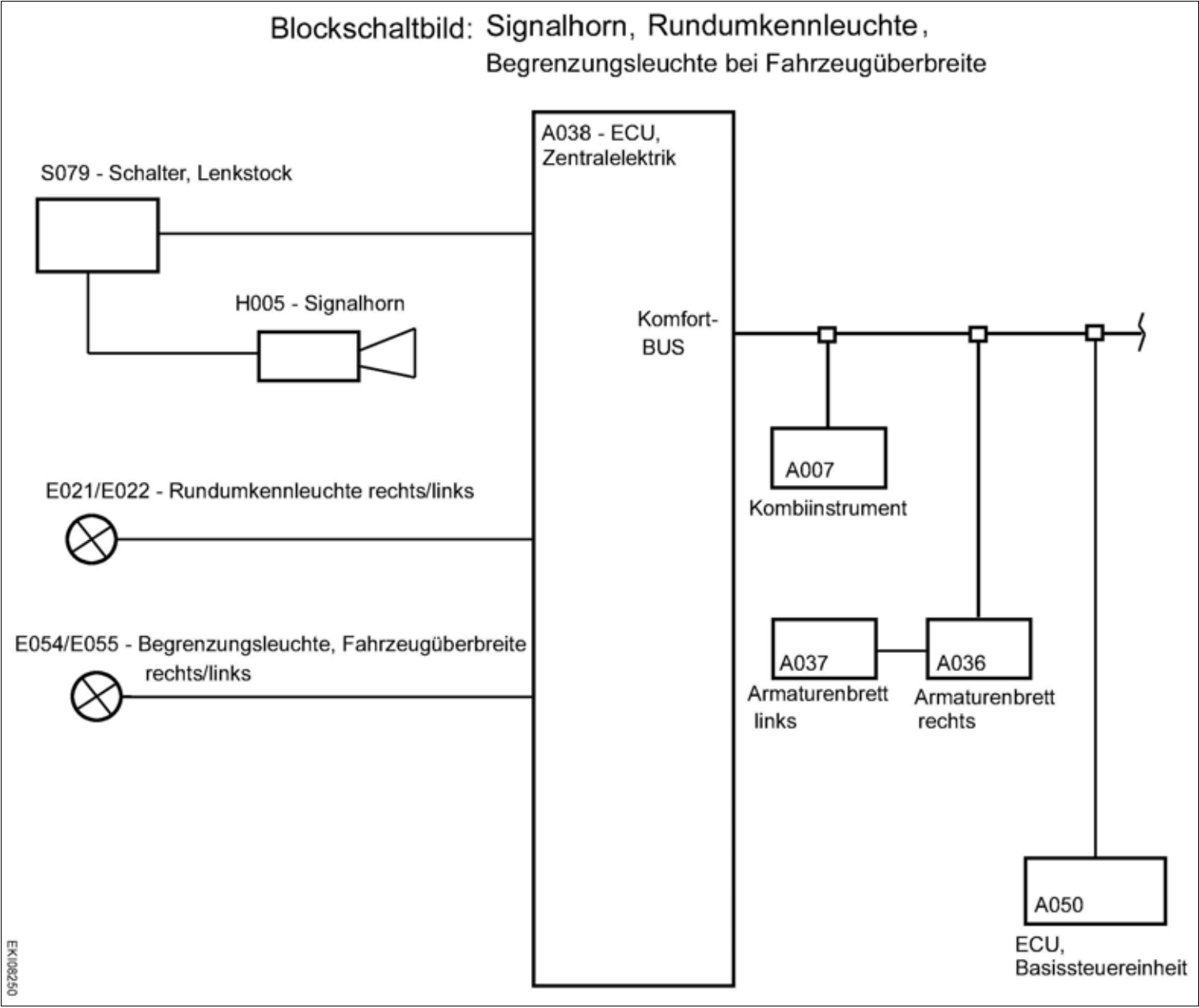


Fig. 40.

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: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

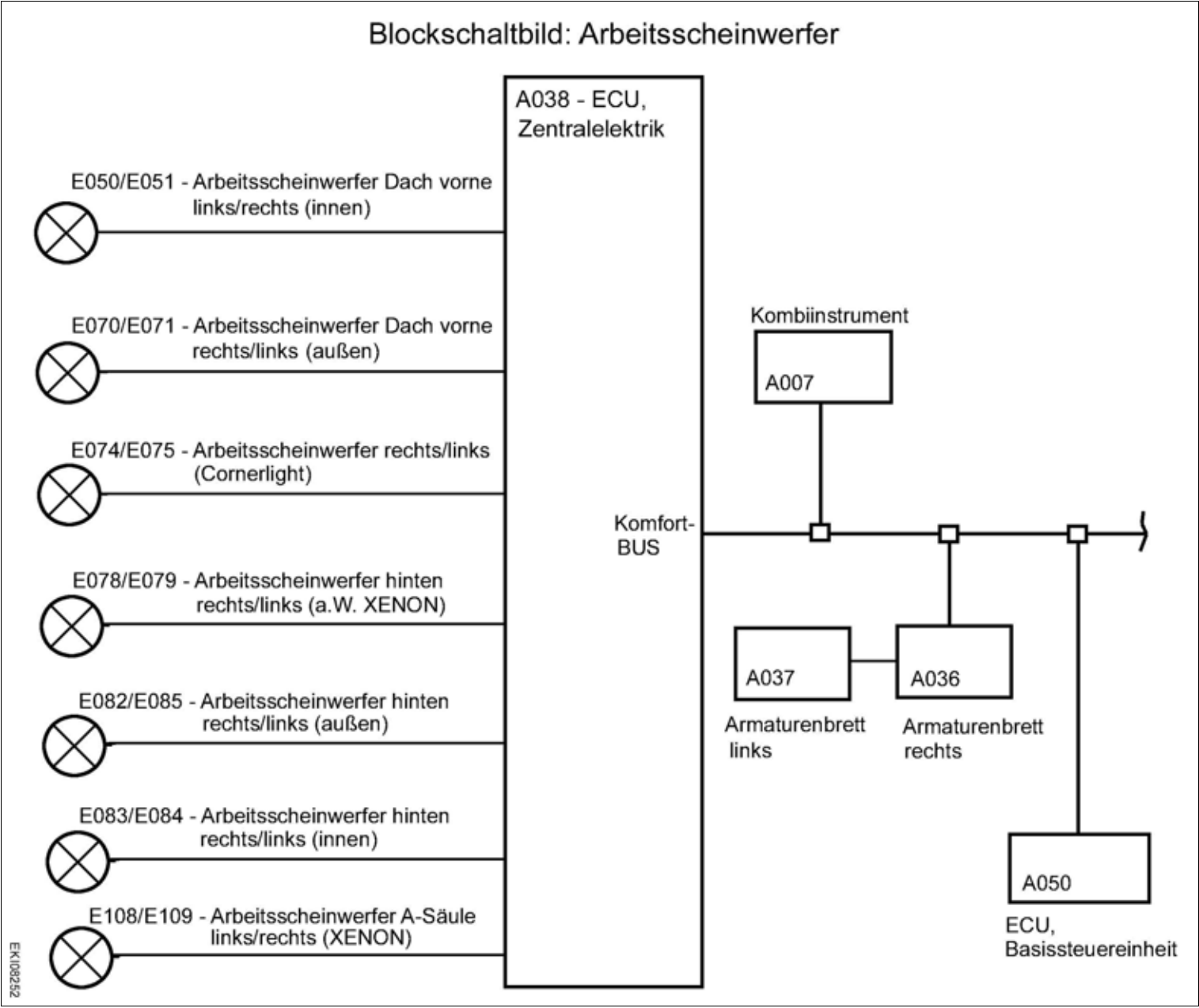


Fig. 41.

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**

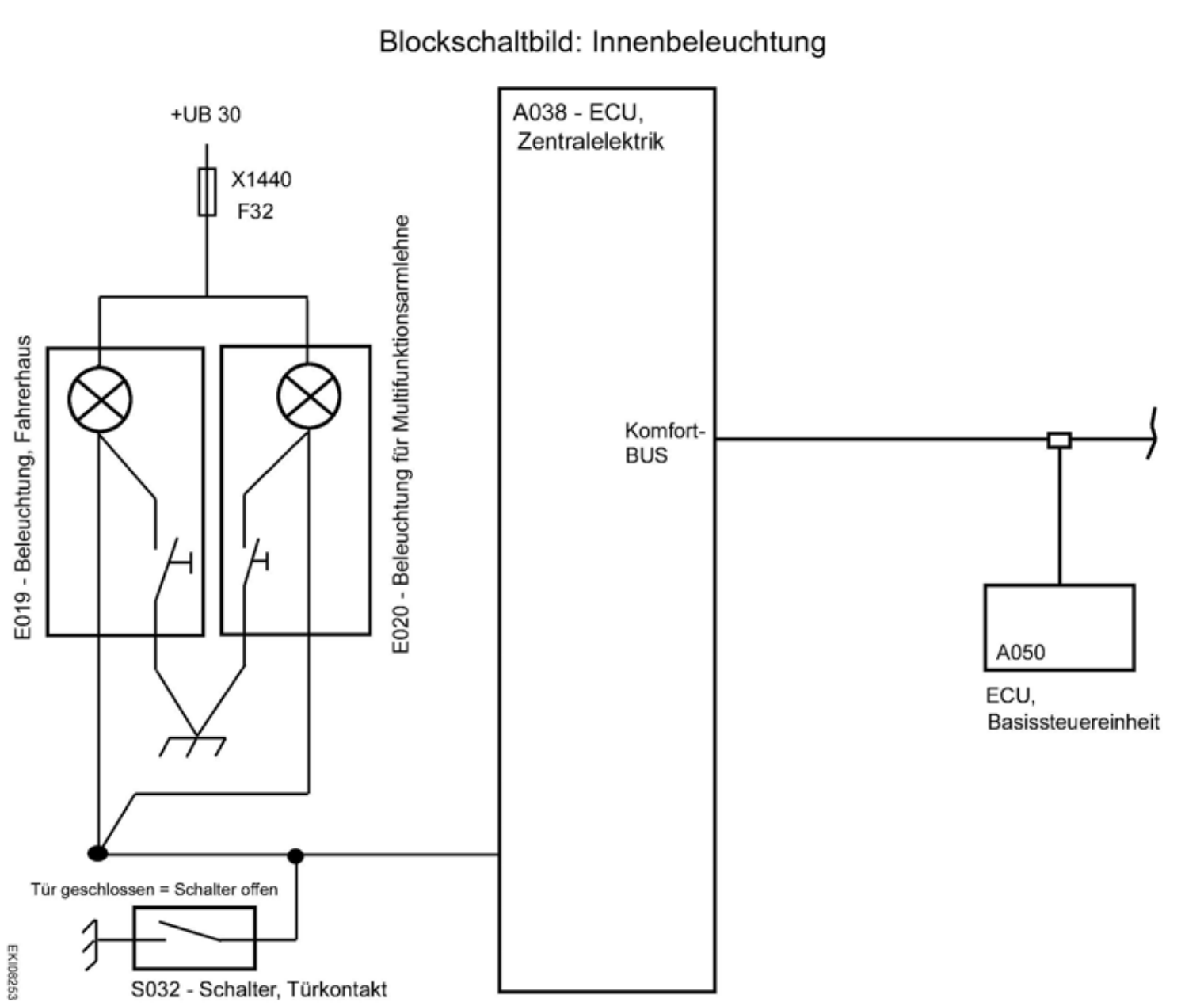
Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
Activation of: E050 - Work lights, front left roof, internal; E051 - Work lights, front right roof, internal					
C21 (X1406)	+supply to relay no. 13 + UB 30 Fuse F28 (X1440)	Ignition OFF	12 VDC	0 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 component
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 56](#)

10 A038 interior lighting

Circuit diagram: interior lighting





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 component
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

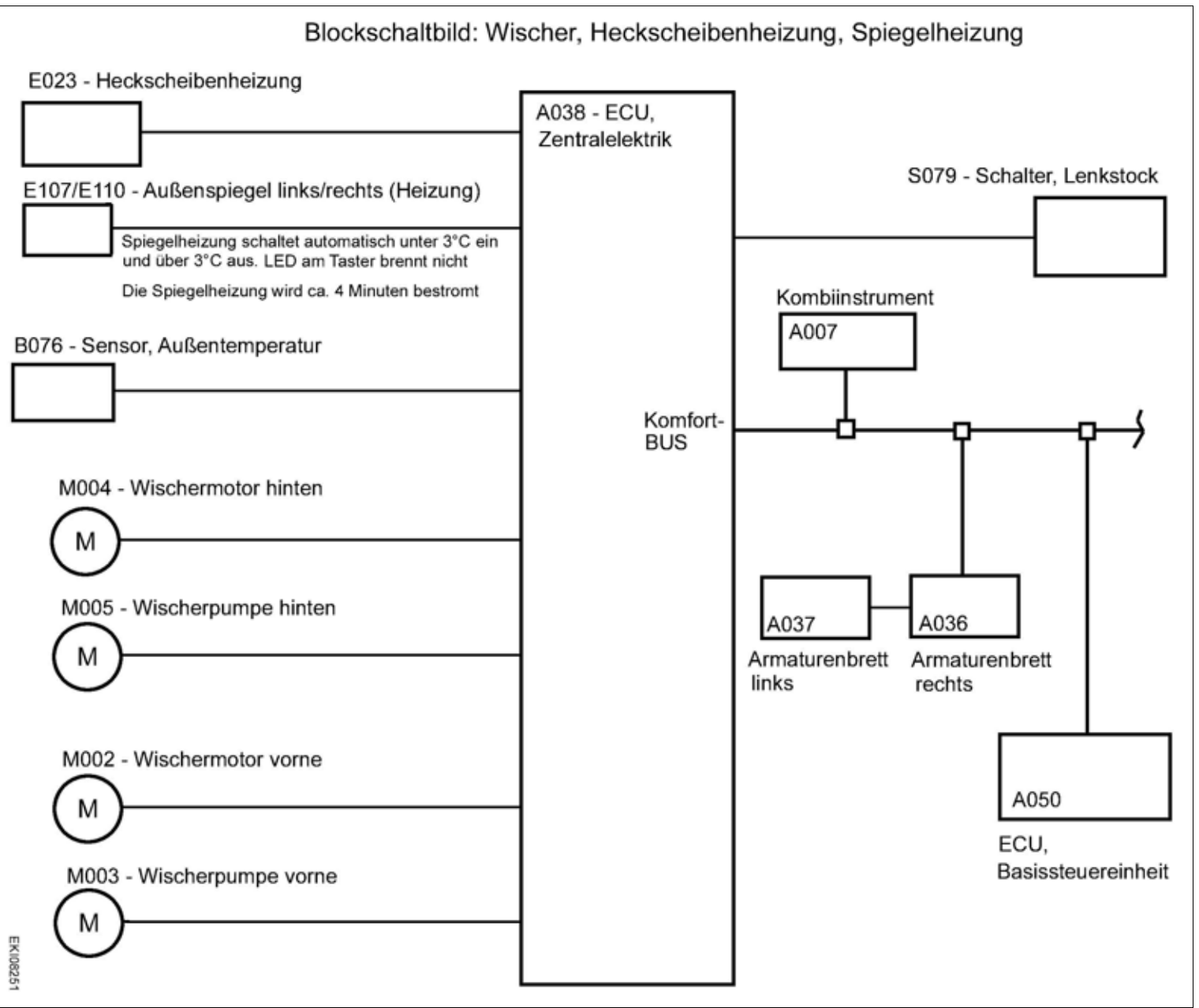


Fig. 43.

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](#)

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-



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
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 electrical system				

Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
		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 of M003 - 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 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

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)

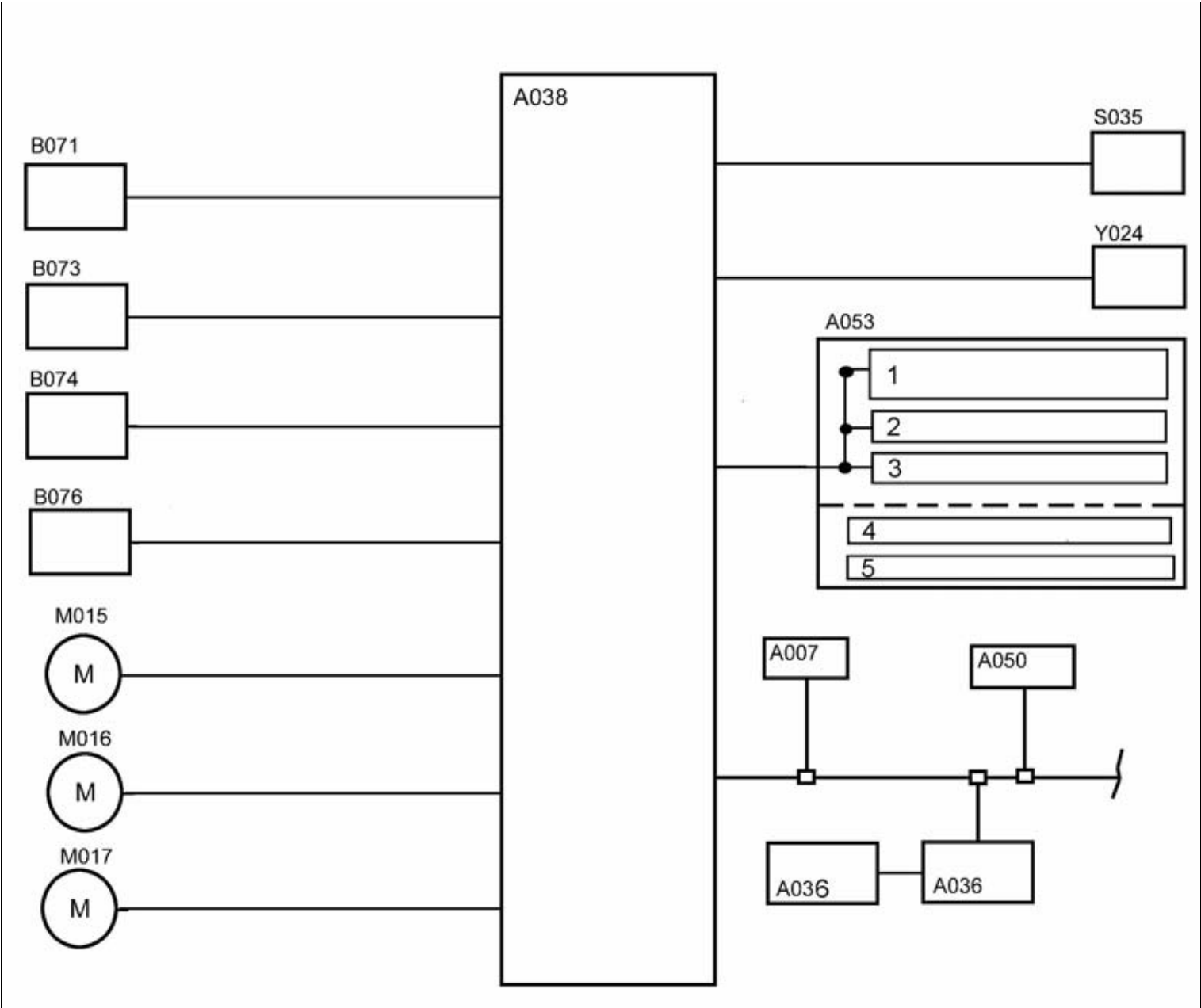


Fig. 44.

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

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-

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 component
		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 component
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
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 component
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 compressor					
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 component
		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

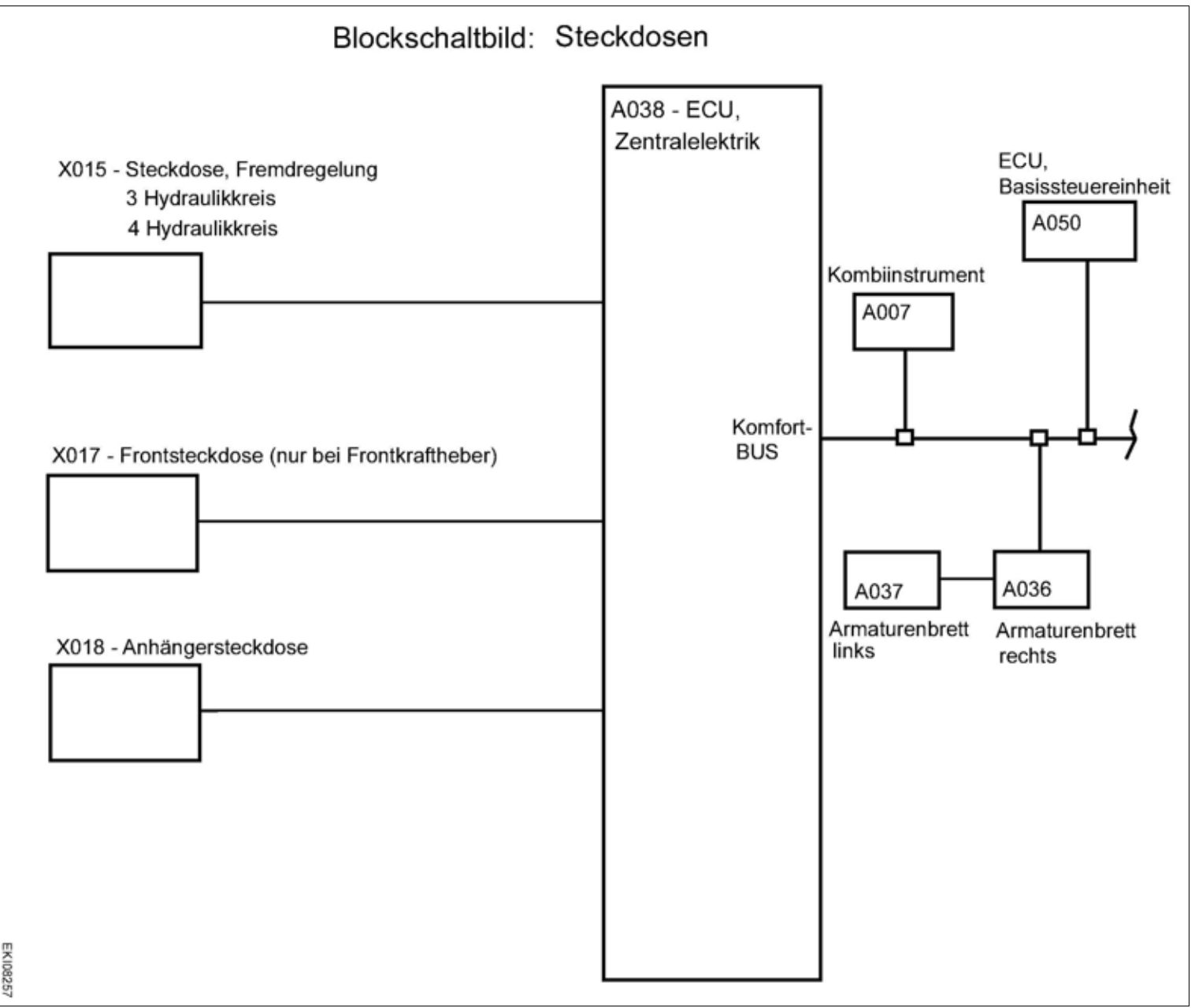


Fig. 45.

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](#)

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-



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 component
		"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 loadable	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

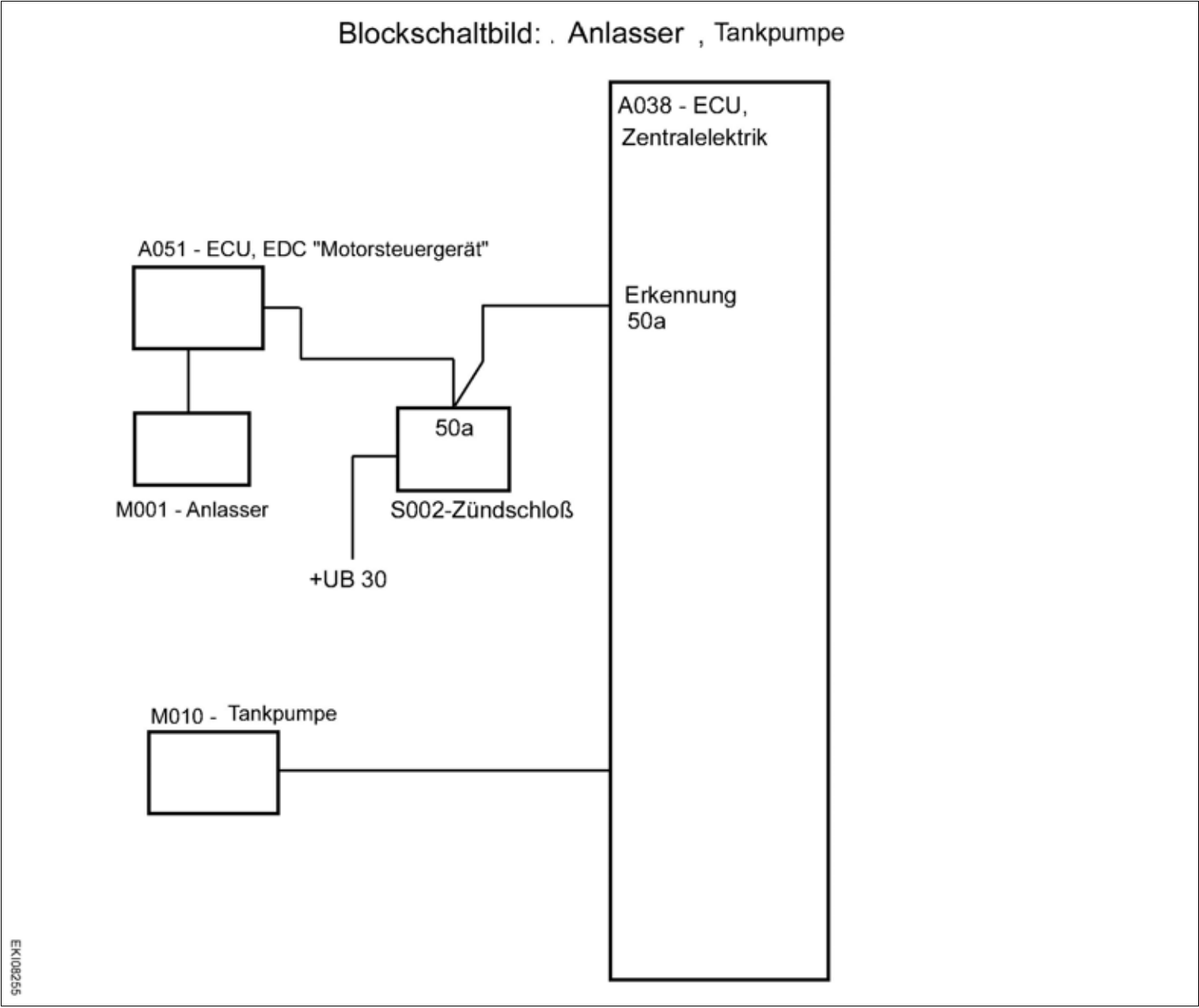


Fig. 46.

Circuit diagram: starter control

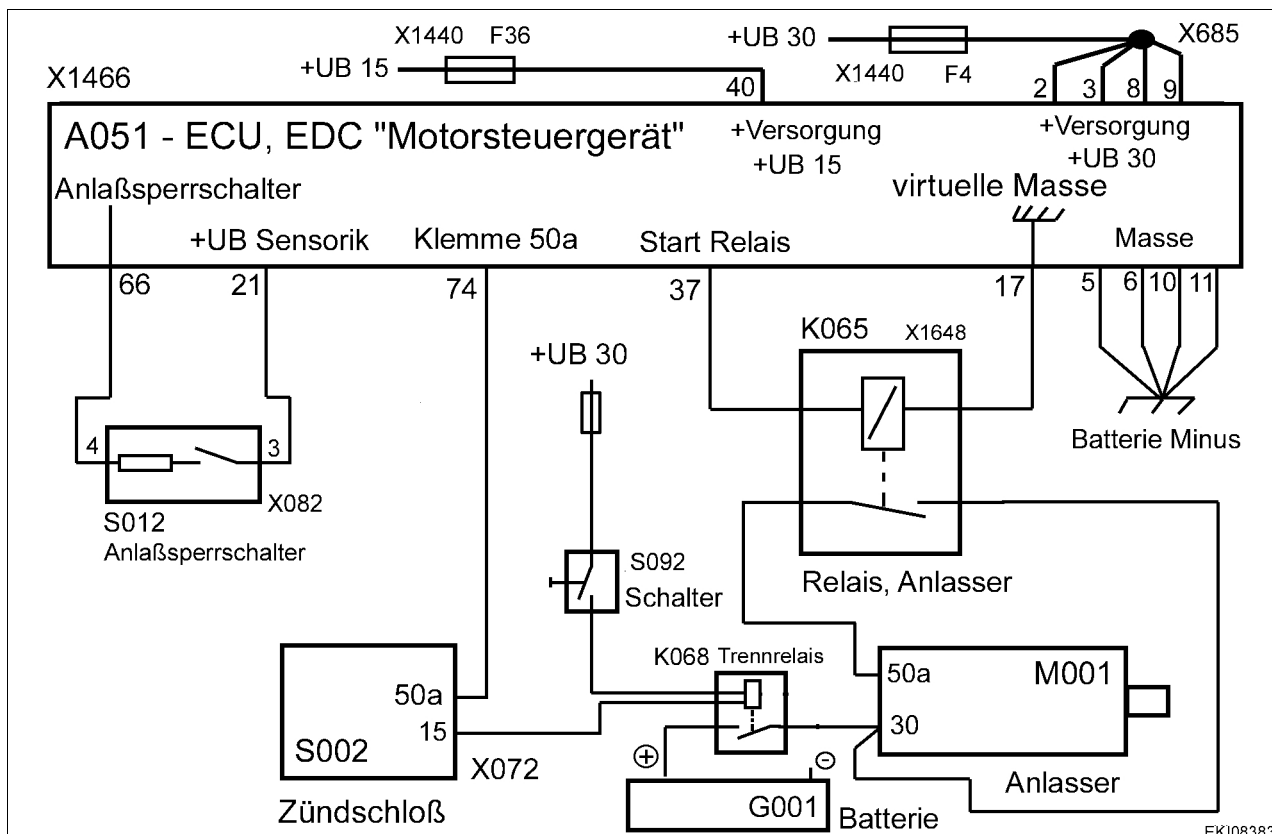


Fig. 47.

EK108383
1007332

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	S092	- Battery disconnect switch
K065	- Starter relay		
		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

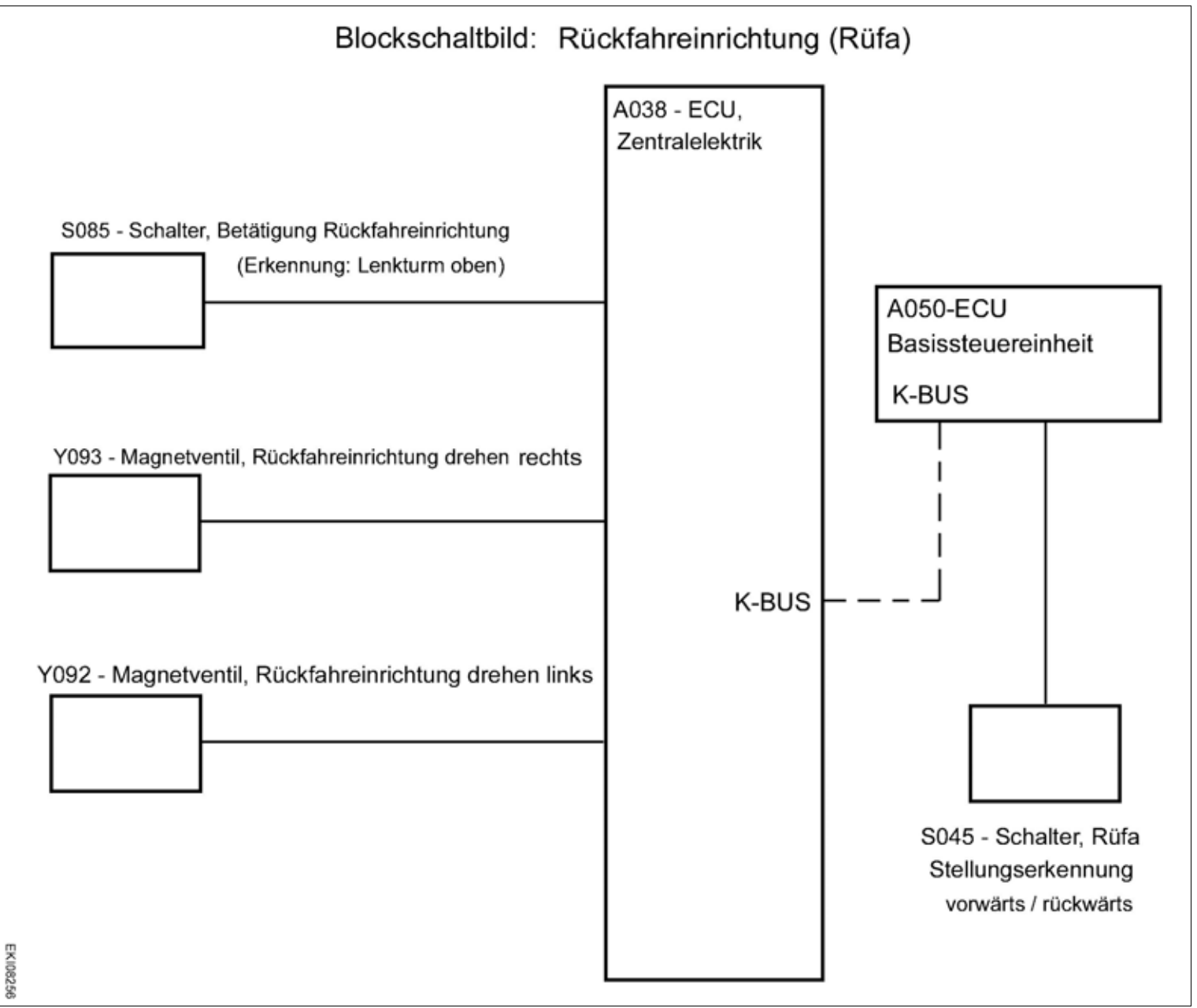


Fig. 48.

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](#)

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



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

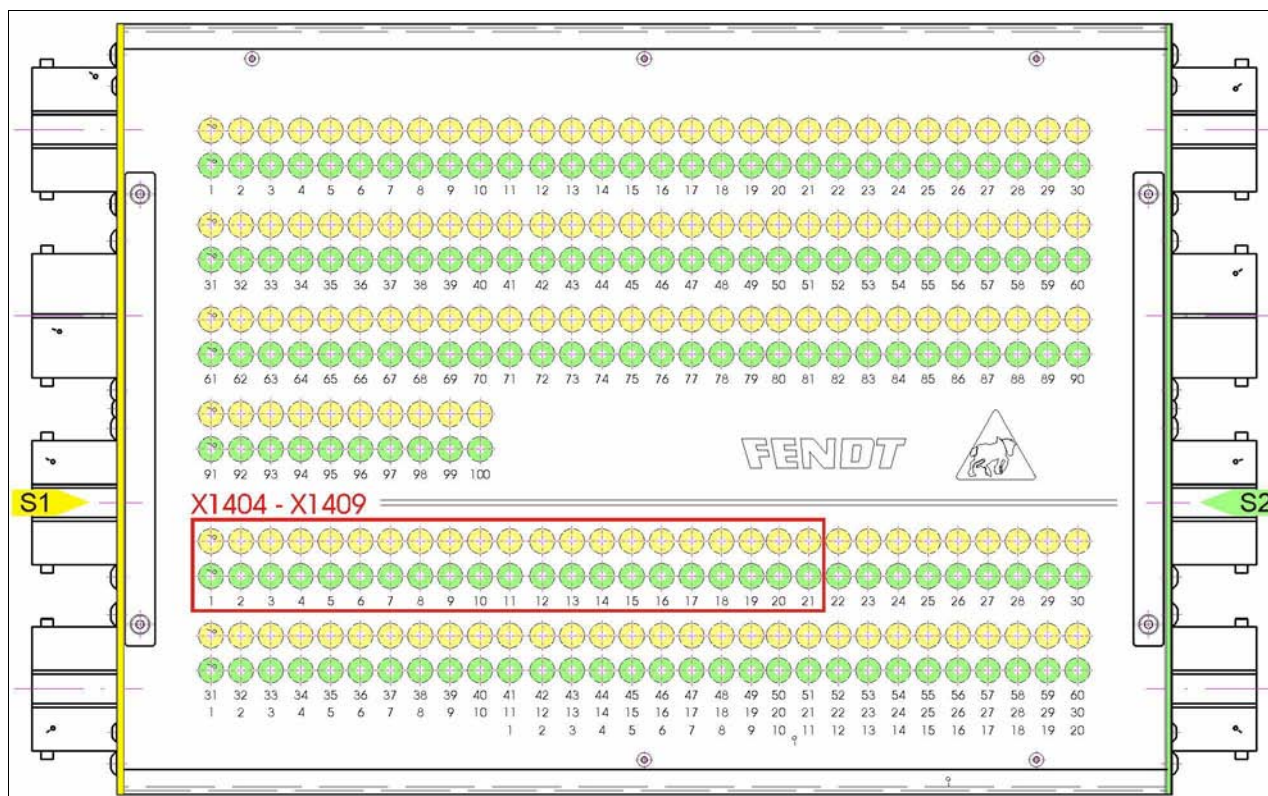


Fig. 7.

1007509

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.

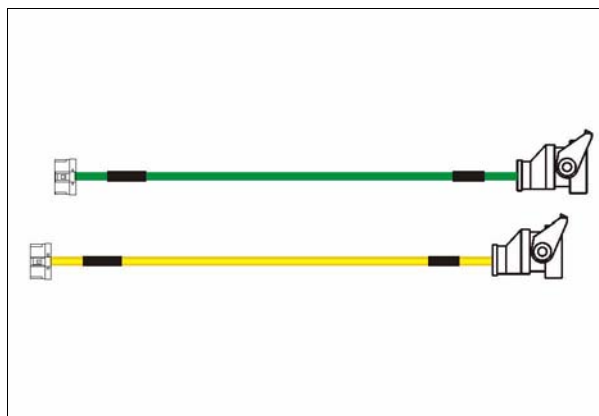


Fig. 8.

1007521

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**.

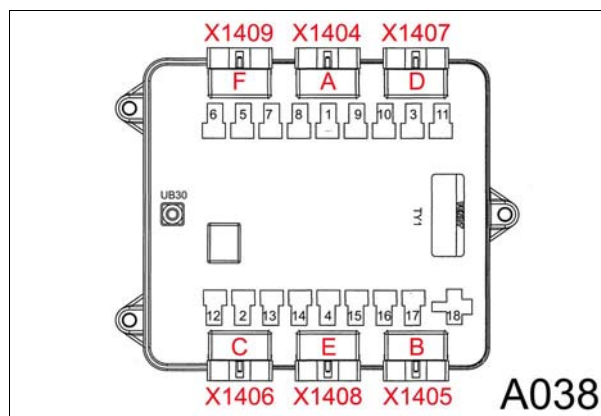


Fig. 9.

1007524

NOTE: see also 57, 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)

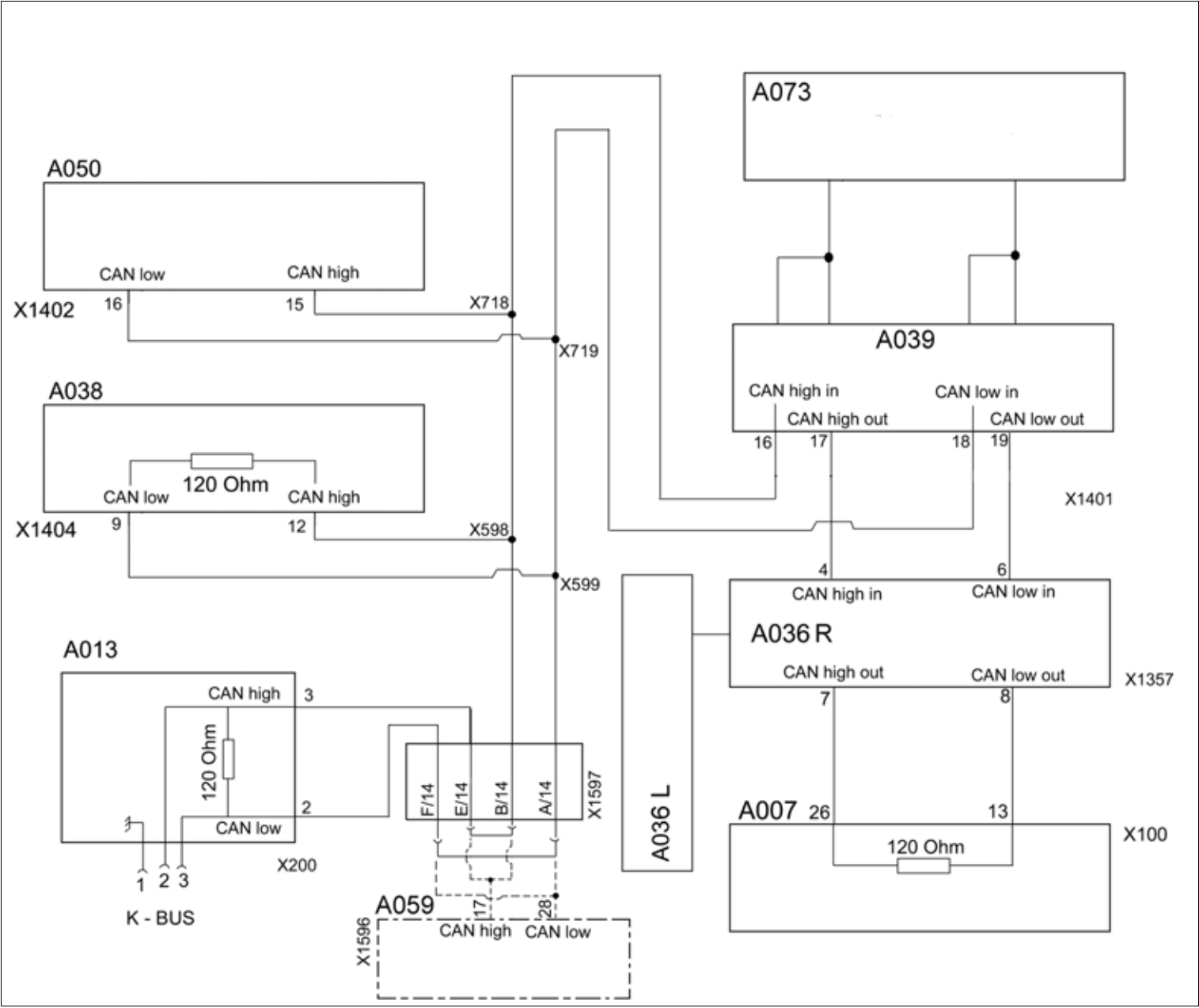


Fig. 50. Control bus, version A (to 9././1700)

1007392

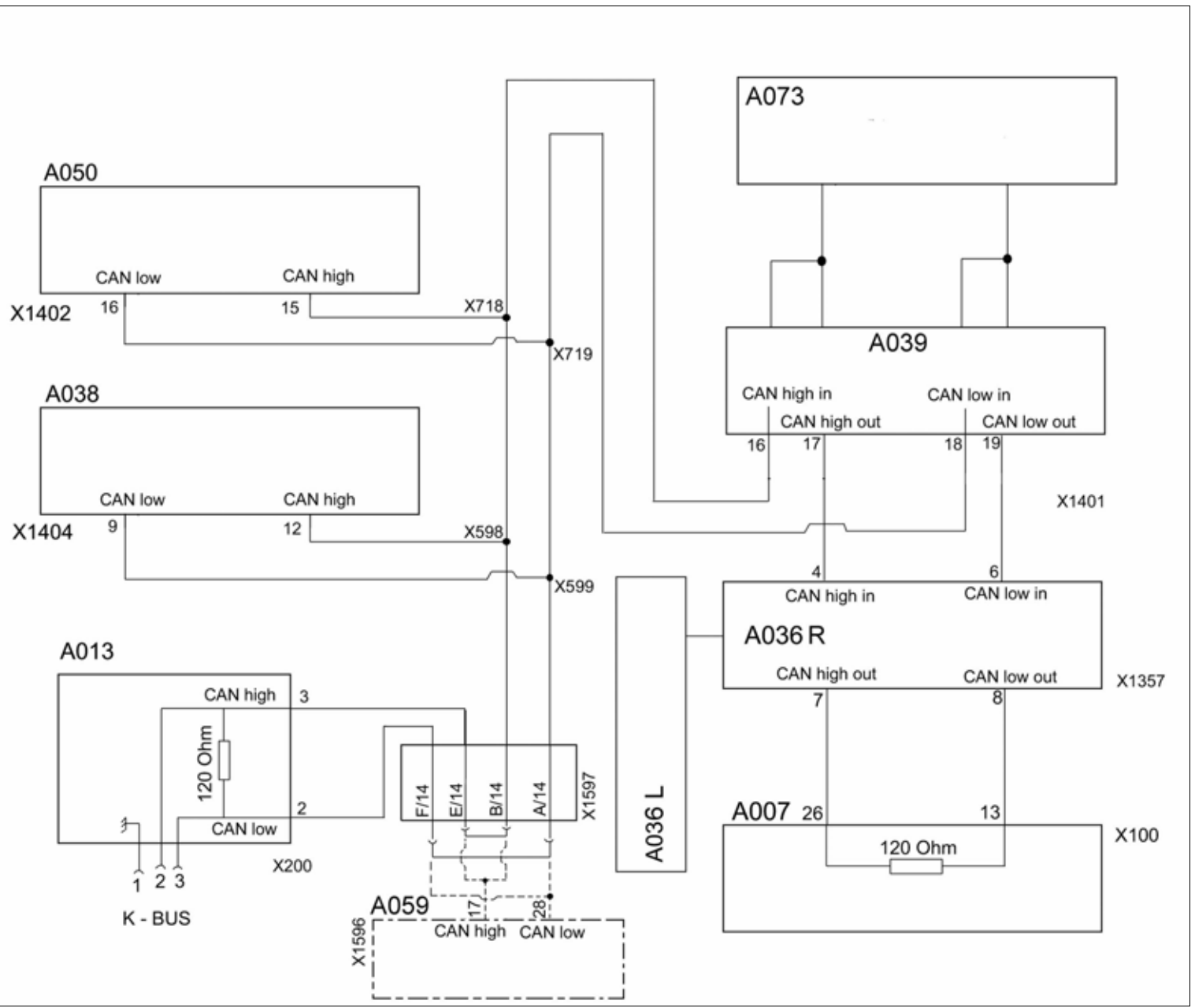


Fig. 51. Control bus, version B (from 9././1701)

1007393

+ 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](#)

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-

T000421
Version 4
04-09-2009

77

+ 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	Pin	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 component
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 (compressor)	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 (compressor) 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.

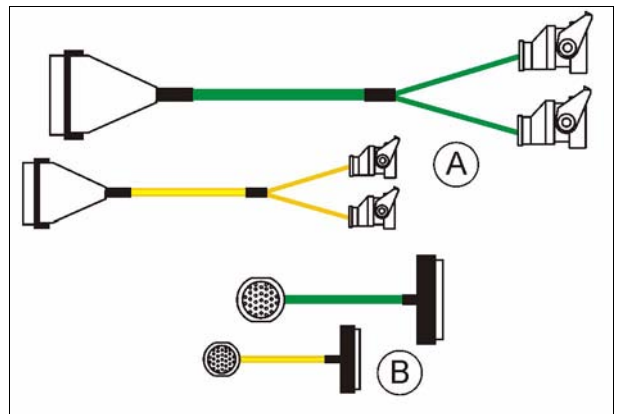


Fig. 11.

I007526

IMPORTANT: Check the adapter box pin range

X1401 = pins 1-29

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

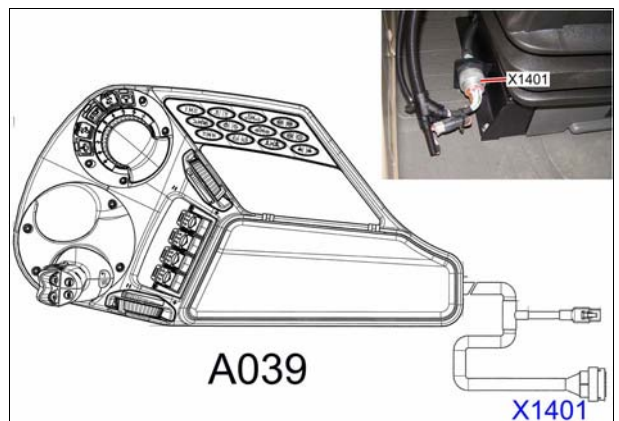


Fig. 12.

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

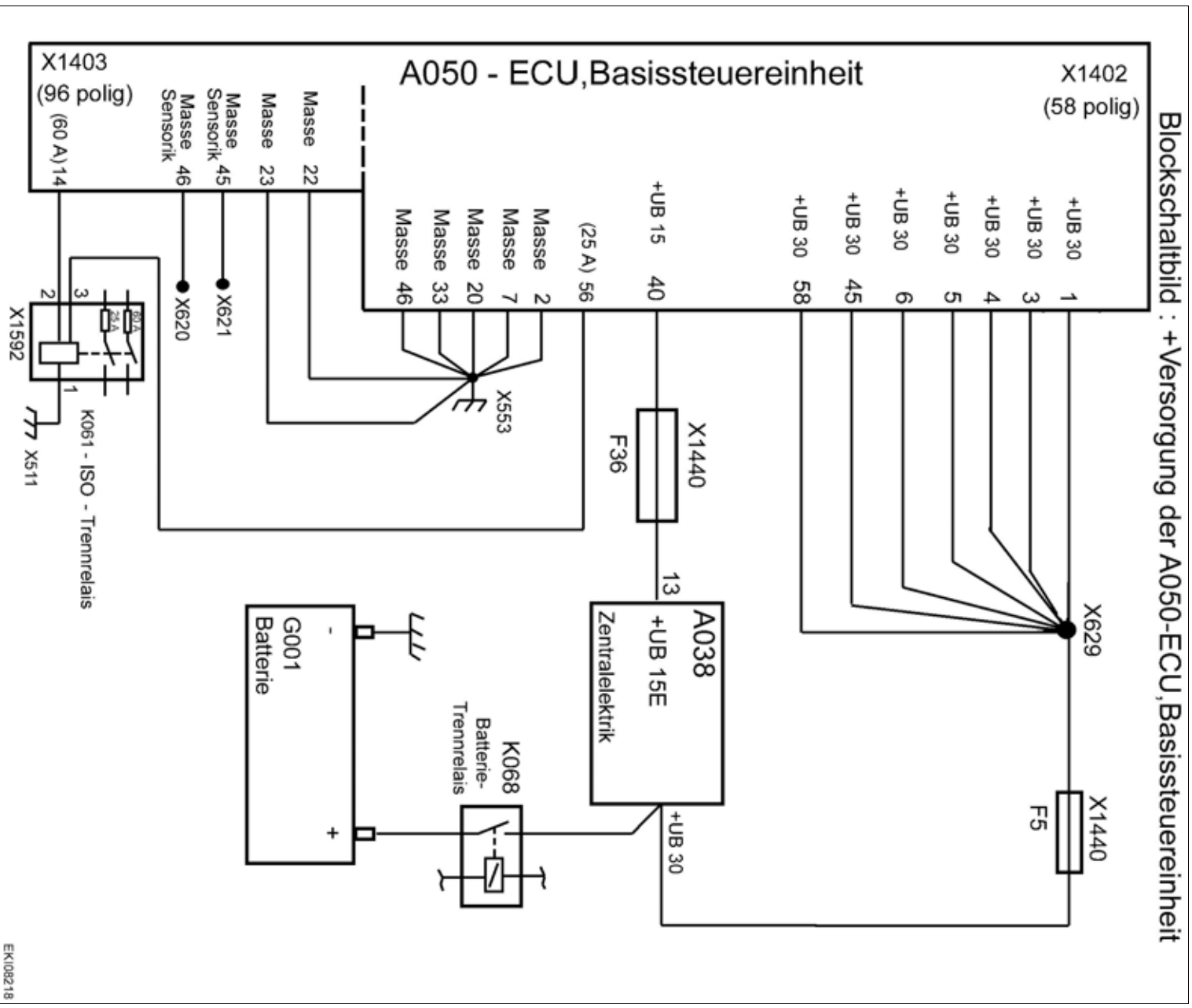


Fig. 53. Circuit diagram: + supply of the **A050** - ECU, basic control unit

919 .. 0101-1000
919 .. 1001-
922 .. 0101-1000
922 .. 1001-
925 .. 0101-1000

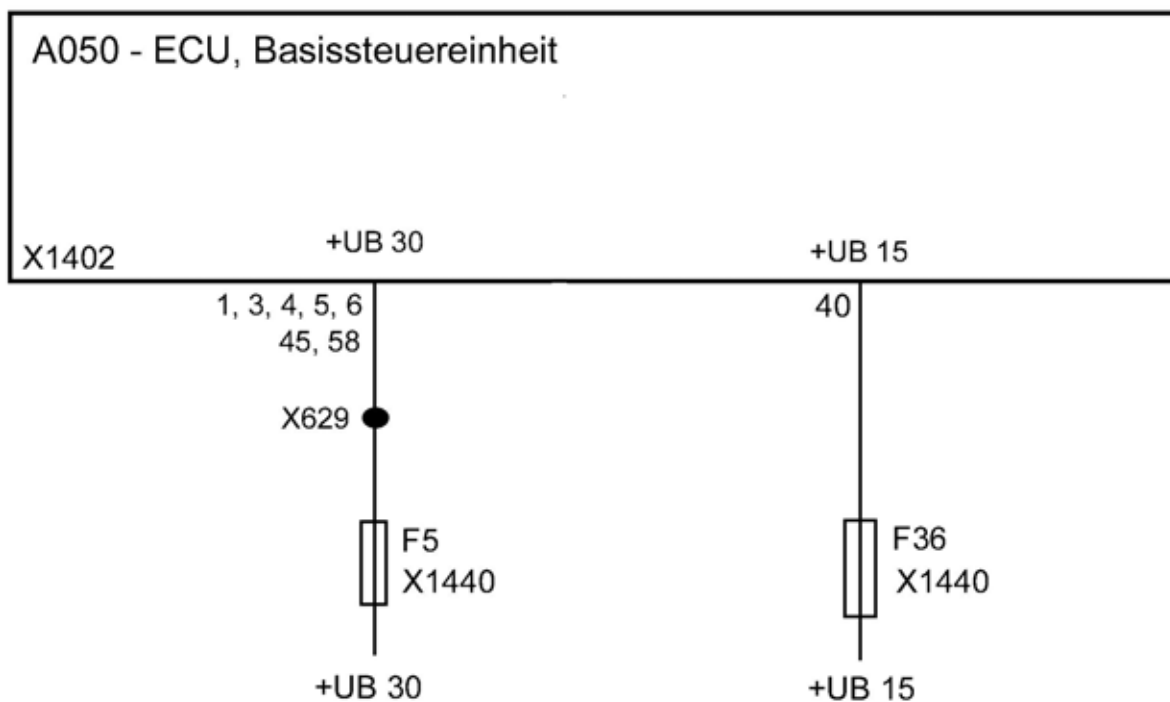
925 .. 1001-
928 .. 0101-1000
928 .. 1001-
931 .. 0101-1000
931 .. 1001-

934 .. 0101-1000
934 .. 1001-

T000329
Version 4
07-09-2009

83

Einschaltspannungen für die A050 - ECU,Basissteuereinheit

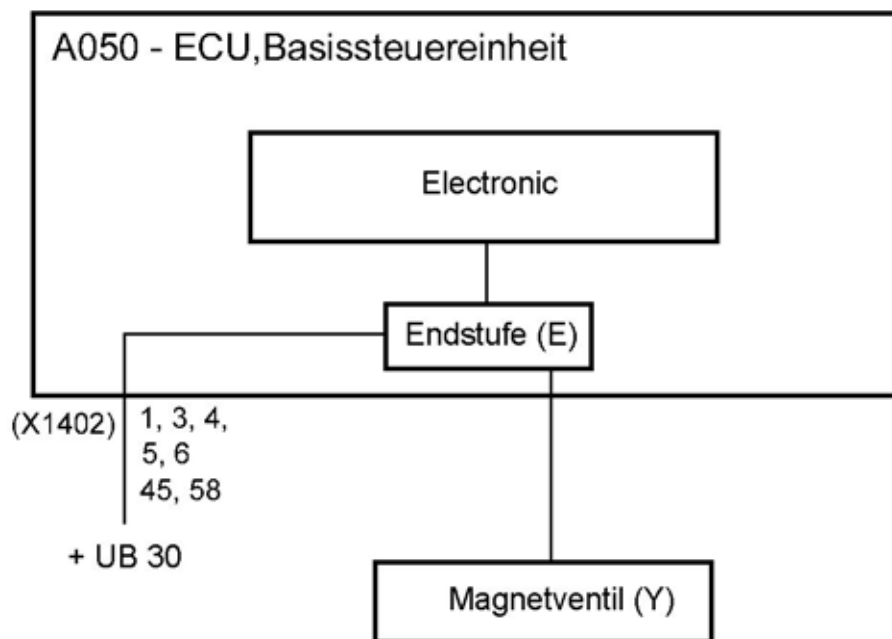


EK108221

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

1002738

Beschreibung Endstufe FENDT 900 Vario

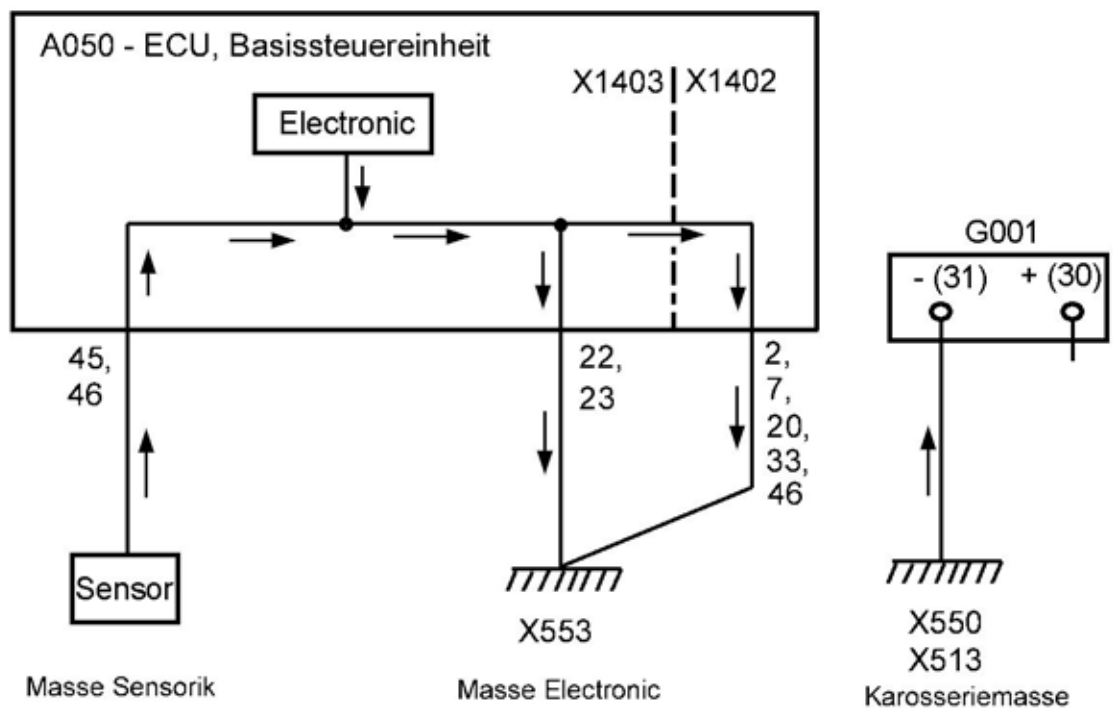


EK108220

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

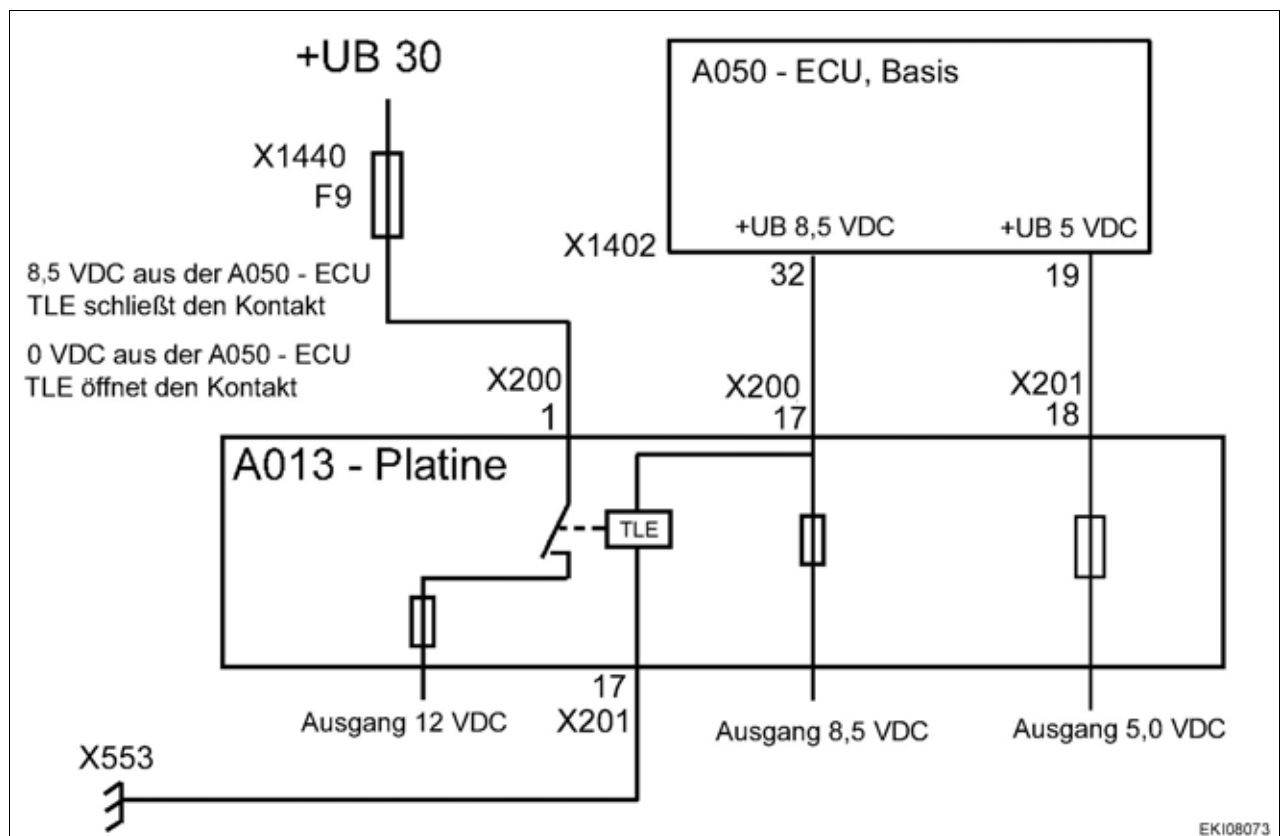
1002739

Massekonzept FENDT 900

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

EKI08219

I002740

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

EKI08073

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](#)

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-

T000329
Version 4
07-09-2009

85



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 without K068 - 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

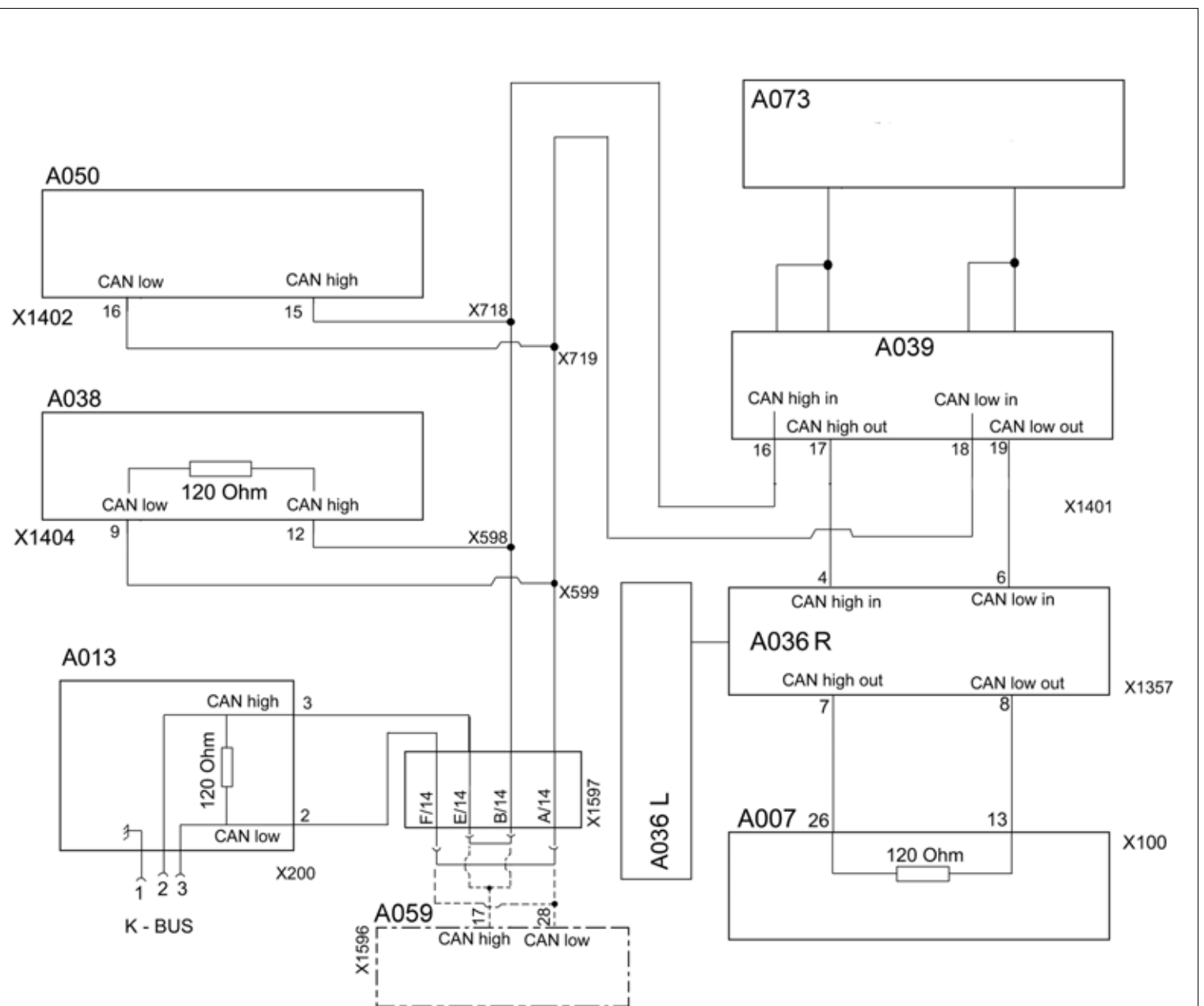


Fig. 59. Control bus, version A (to 9././1700)

1007392

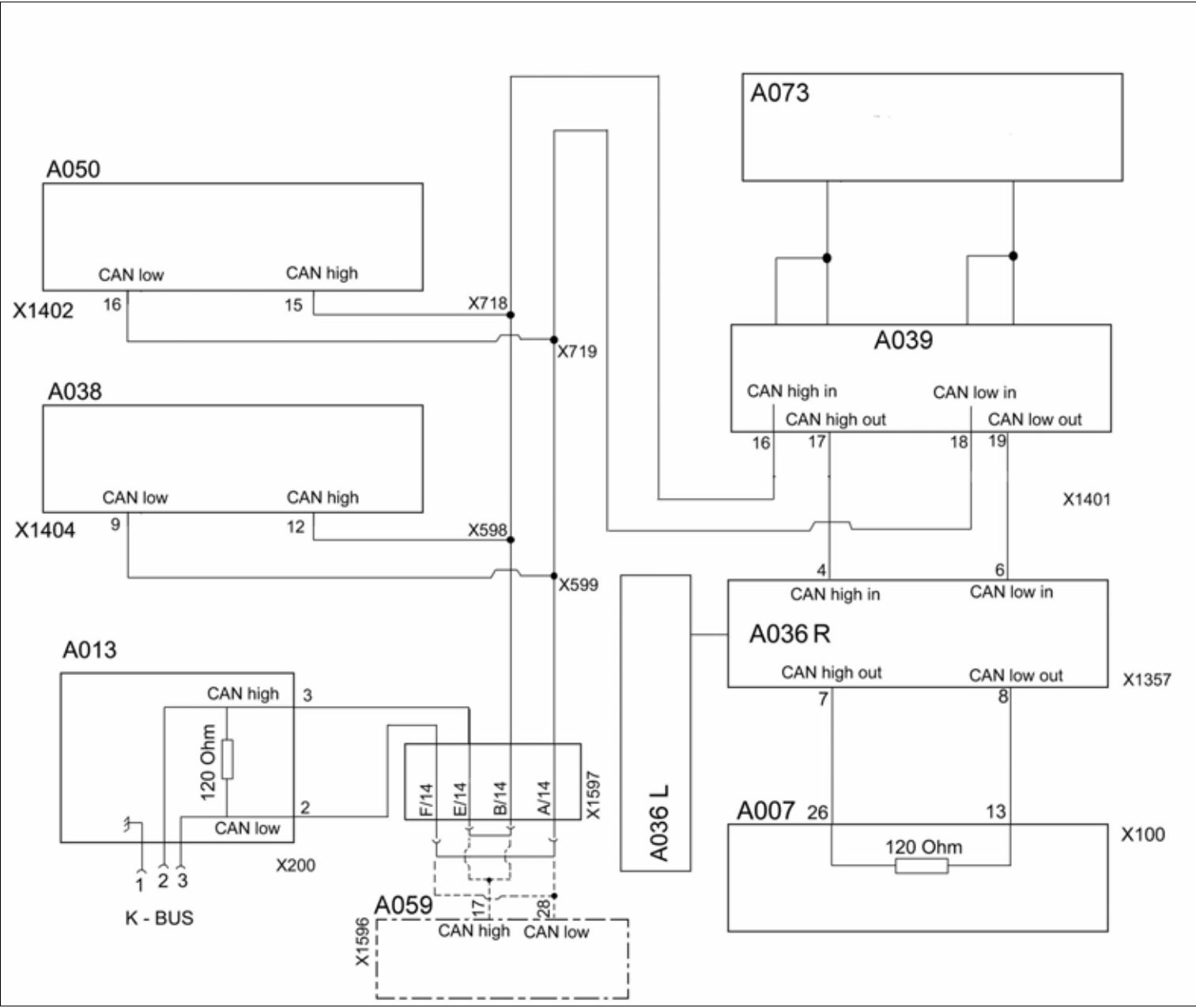


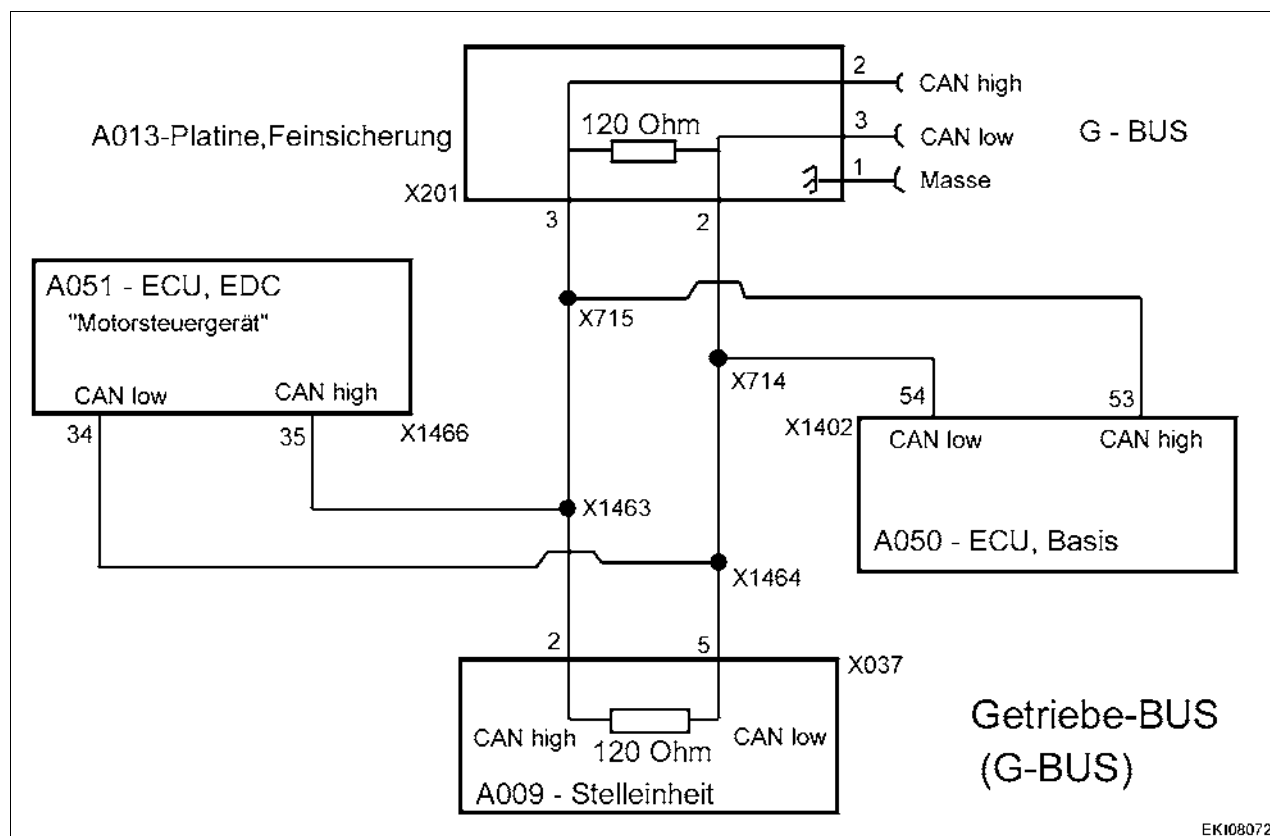
Fig. 60. Control bus, version B (from 9././1701)

1007393

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-



EK108072

Fig. 61. Transmission bus

1000716

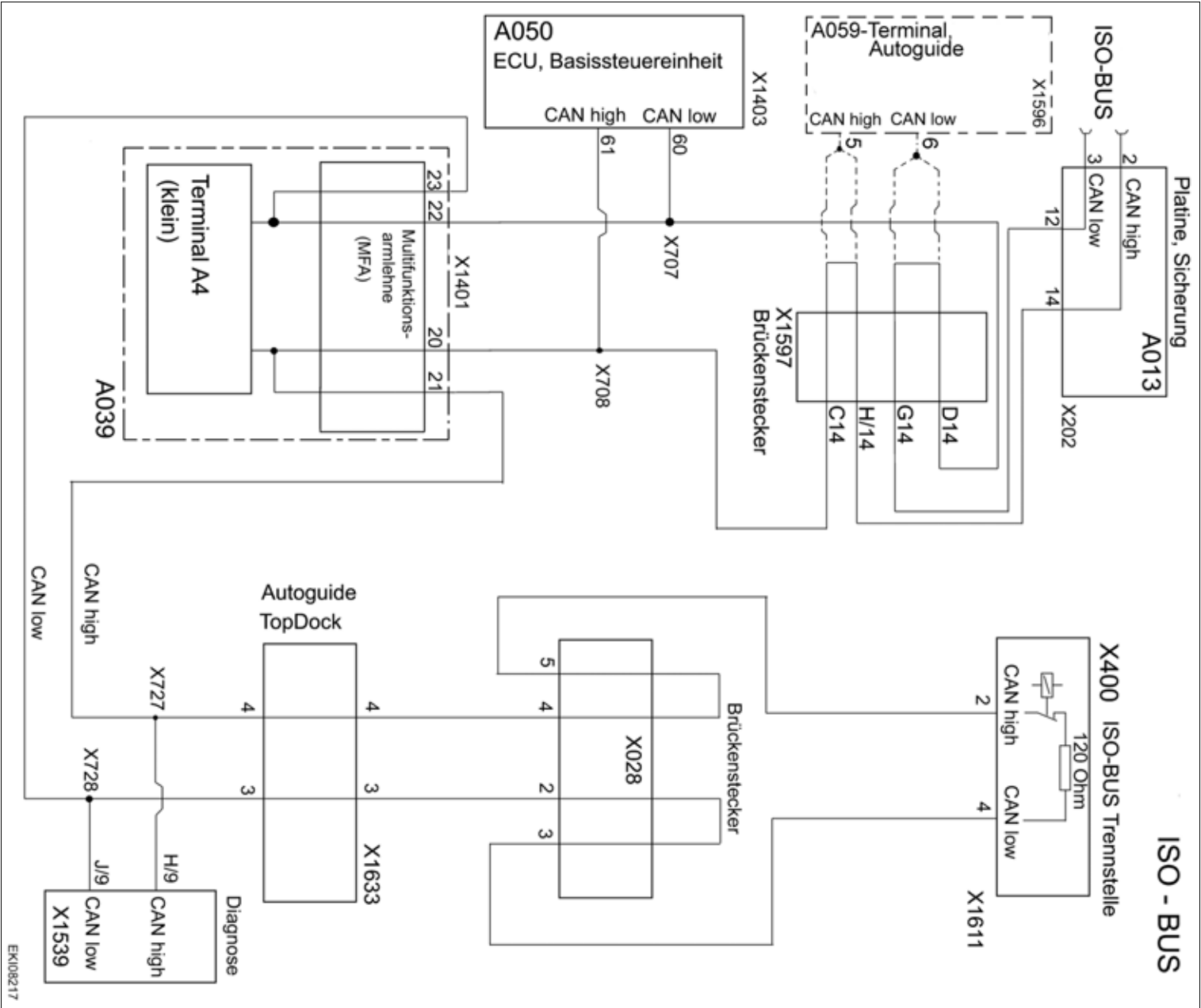


Fig. 62. ISO bus

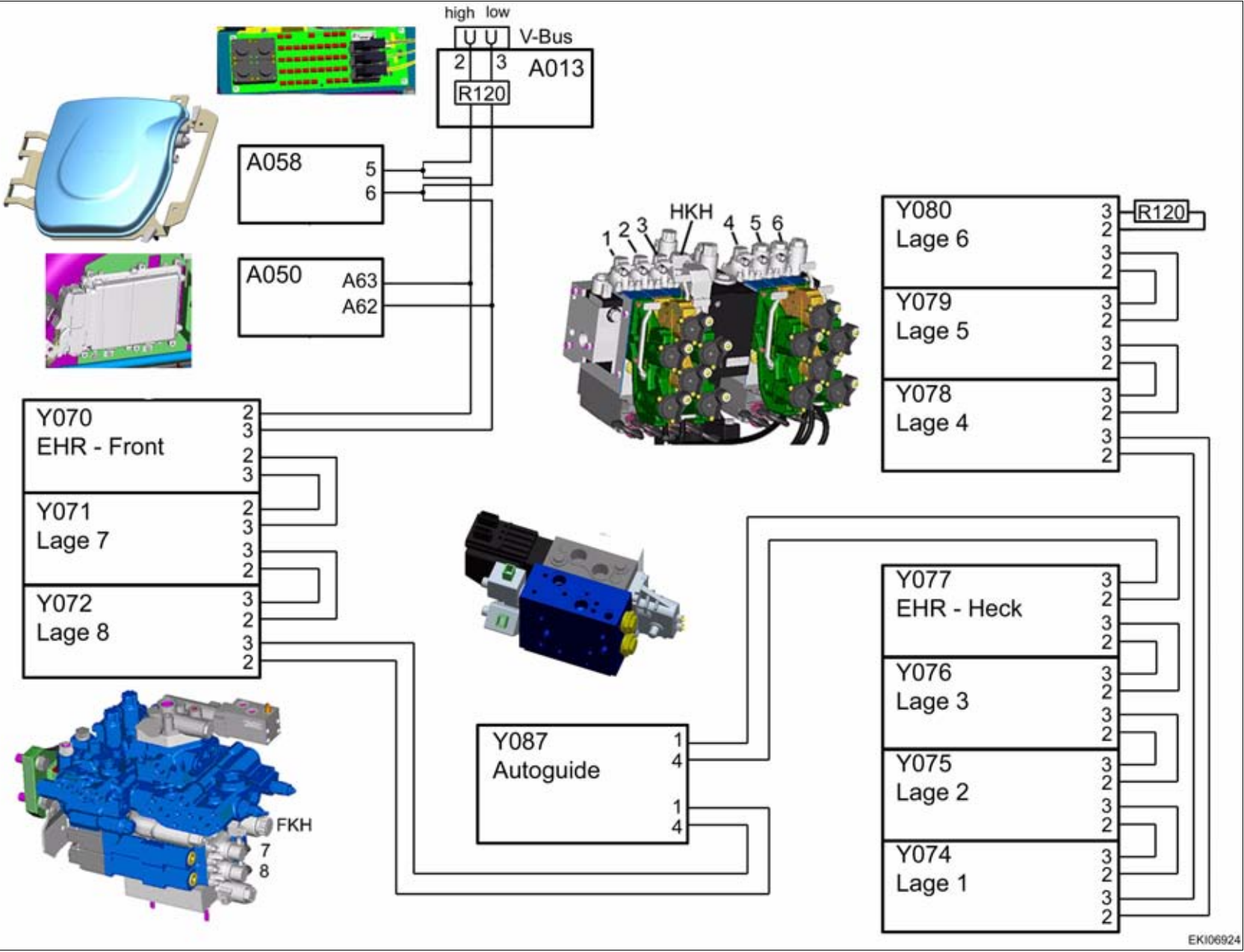


Fig. 63. Valve bus

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](#)

92

T000672

Version 2

04-09-2009

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-

**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 component
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

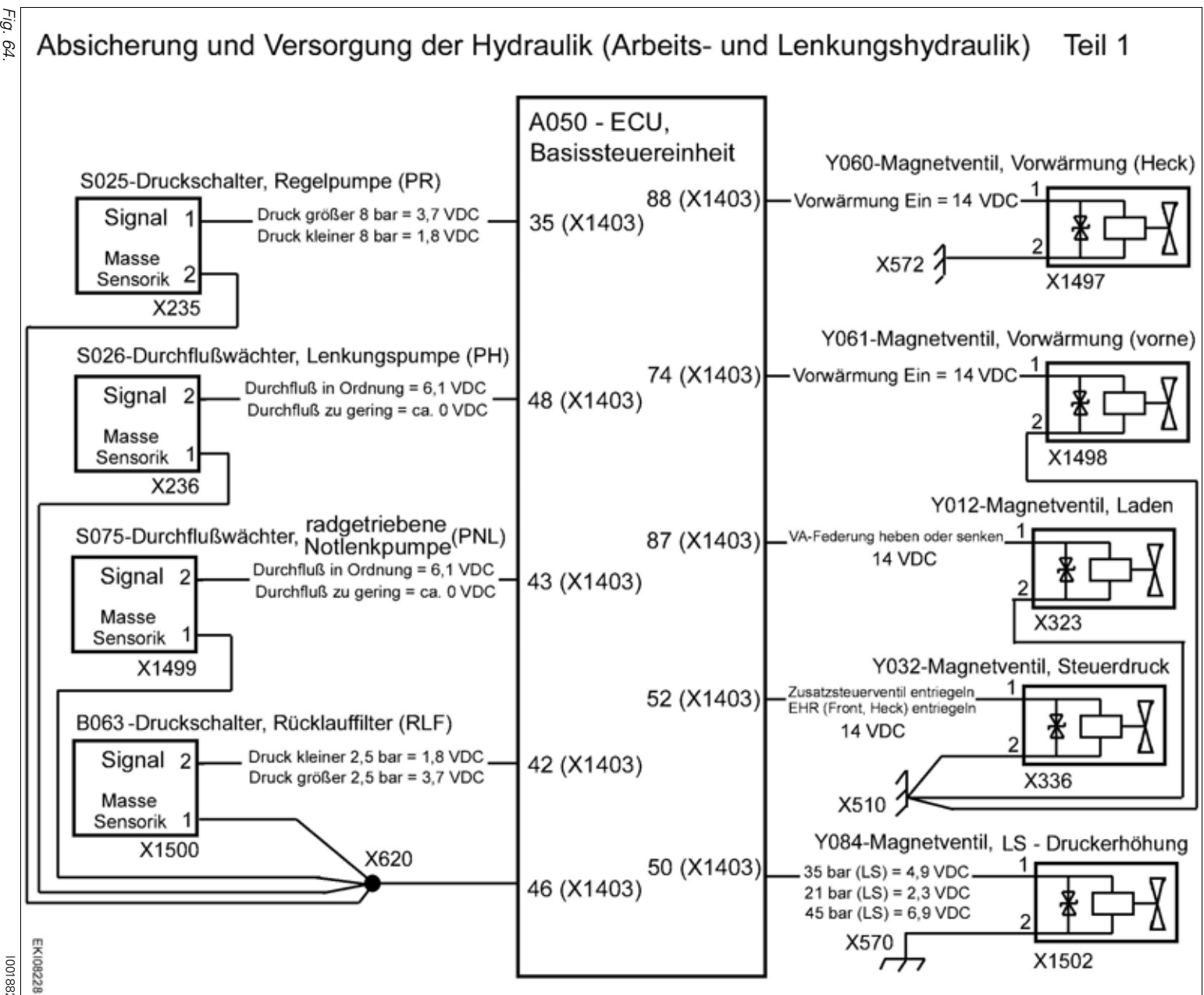


Fig. 64.

919 .. 0101-1000
919 .. 1001-
922 .. 0101-1000
922 .. 1001-
925 .. 0101-1000925 .. 1001-
928 .. 0101-1000
928 .. 1001-
931 .. 0101-1000
931 .. 1001-934 .. 0101-1000
934 .. 1001-T000433
Version 4
04-09-2009

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

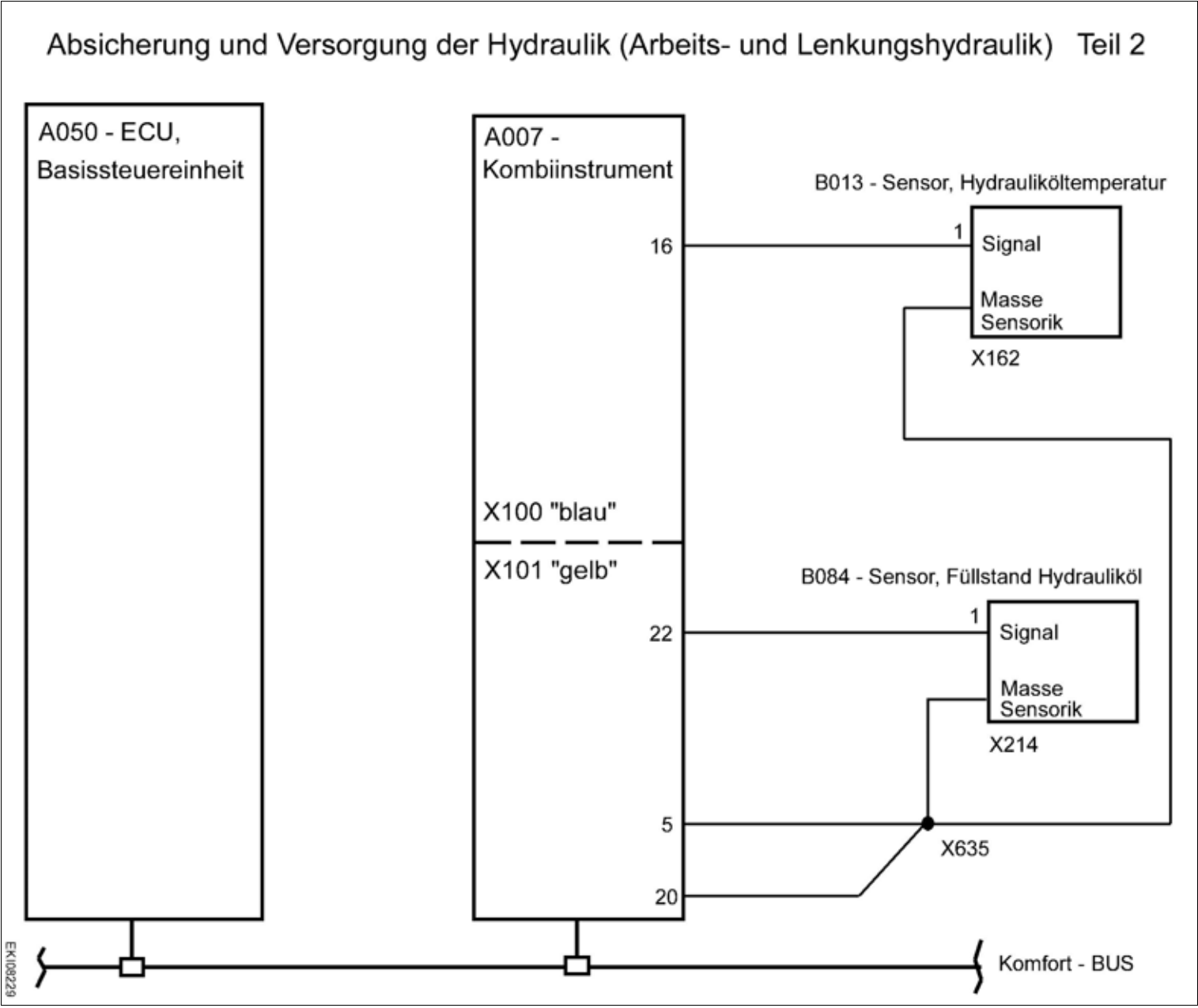


Fig. 65.

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	-	-

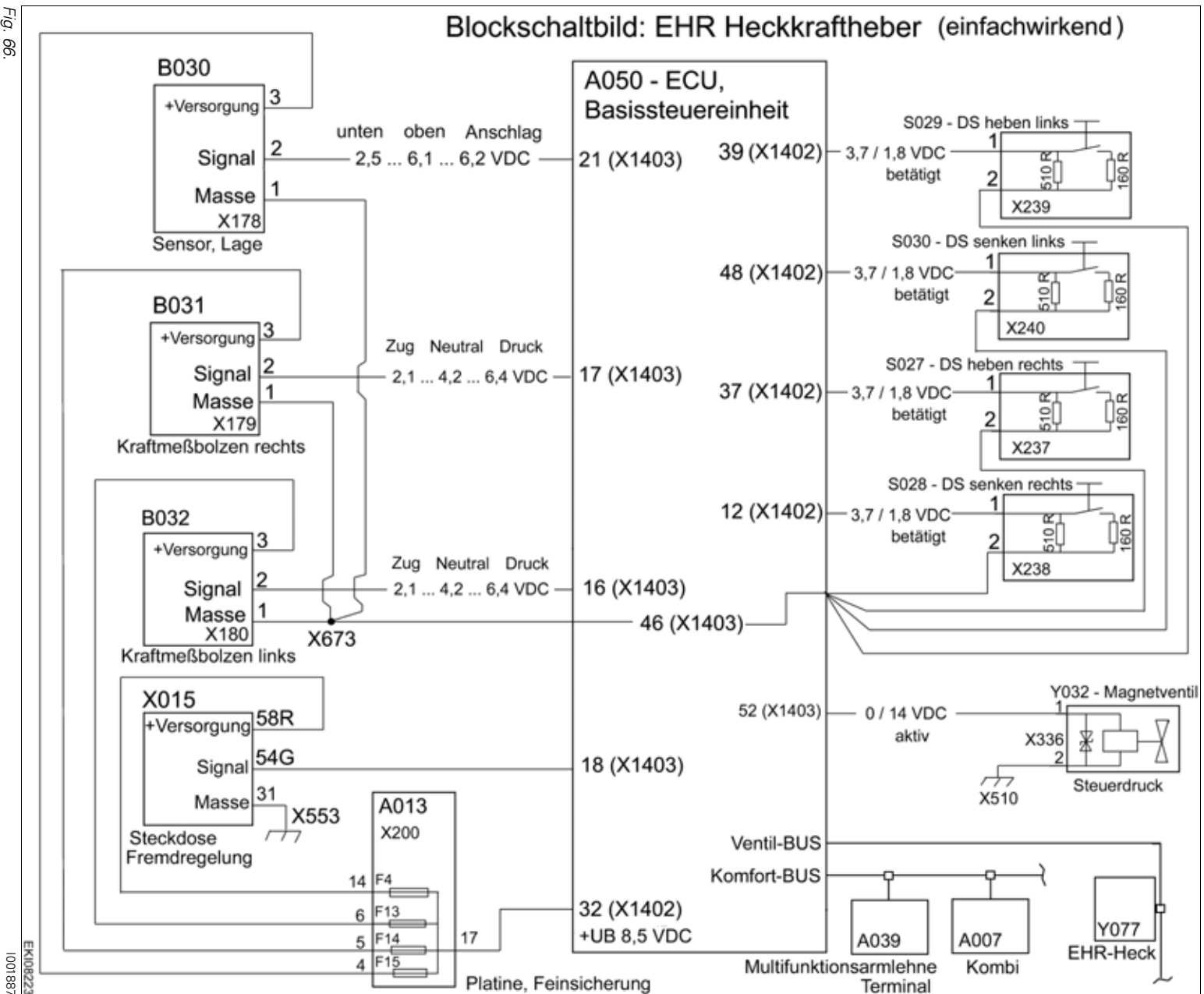
NOTE: [see §19](#)

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")



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

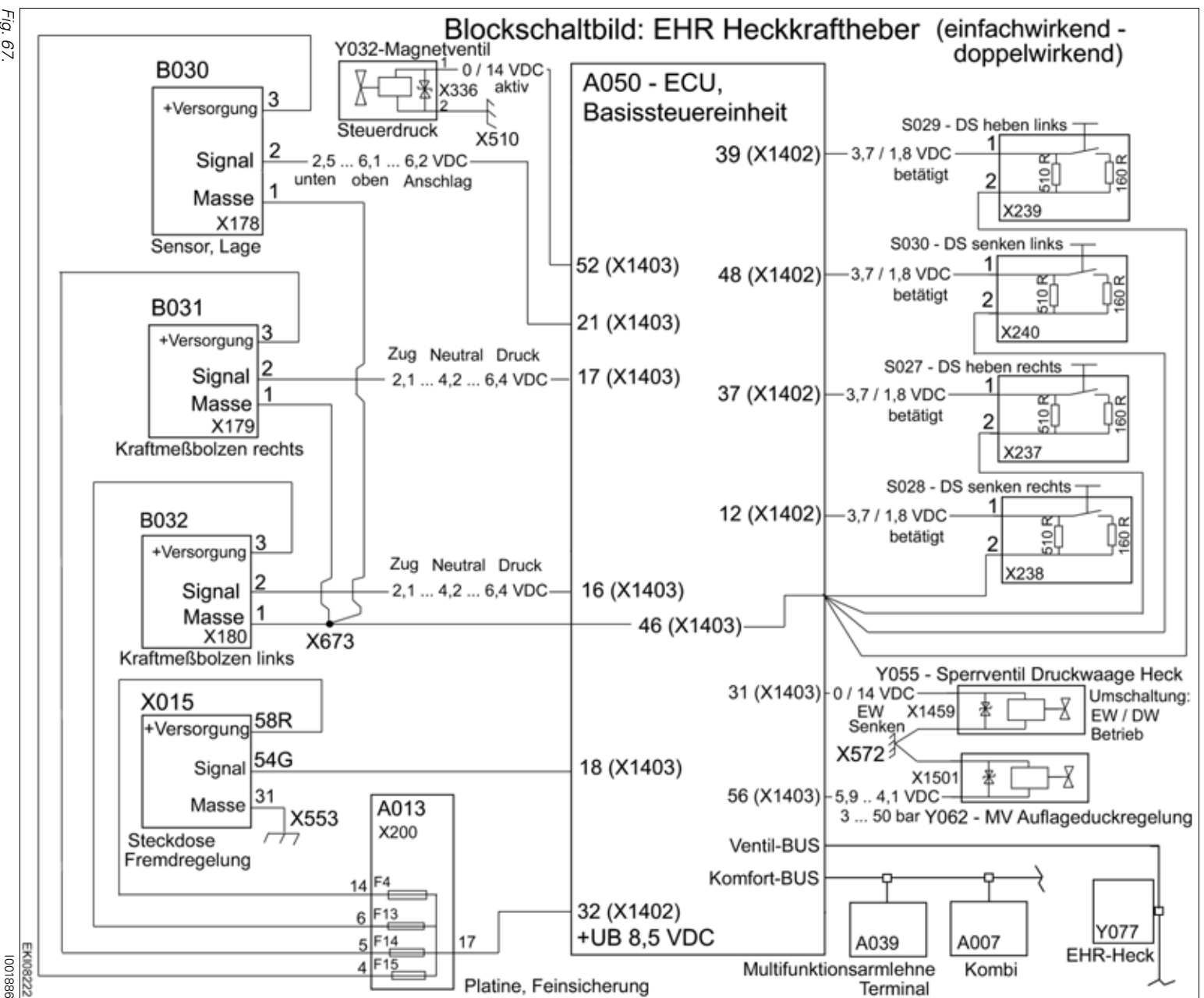


Fig. 67.

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)	The 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 component
		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

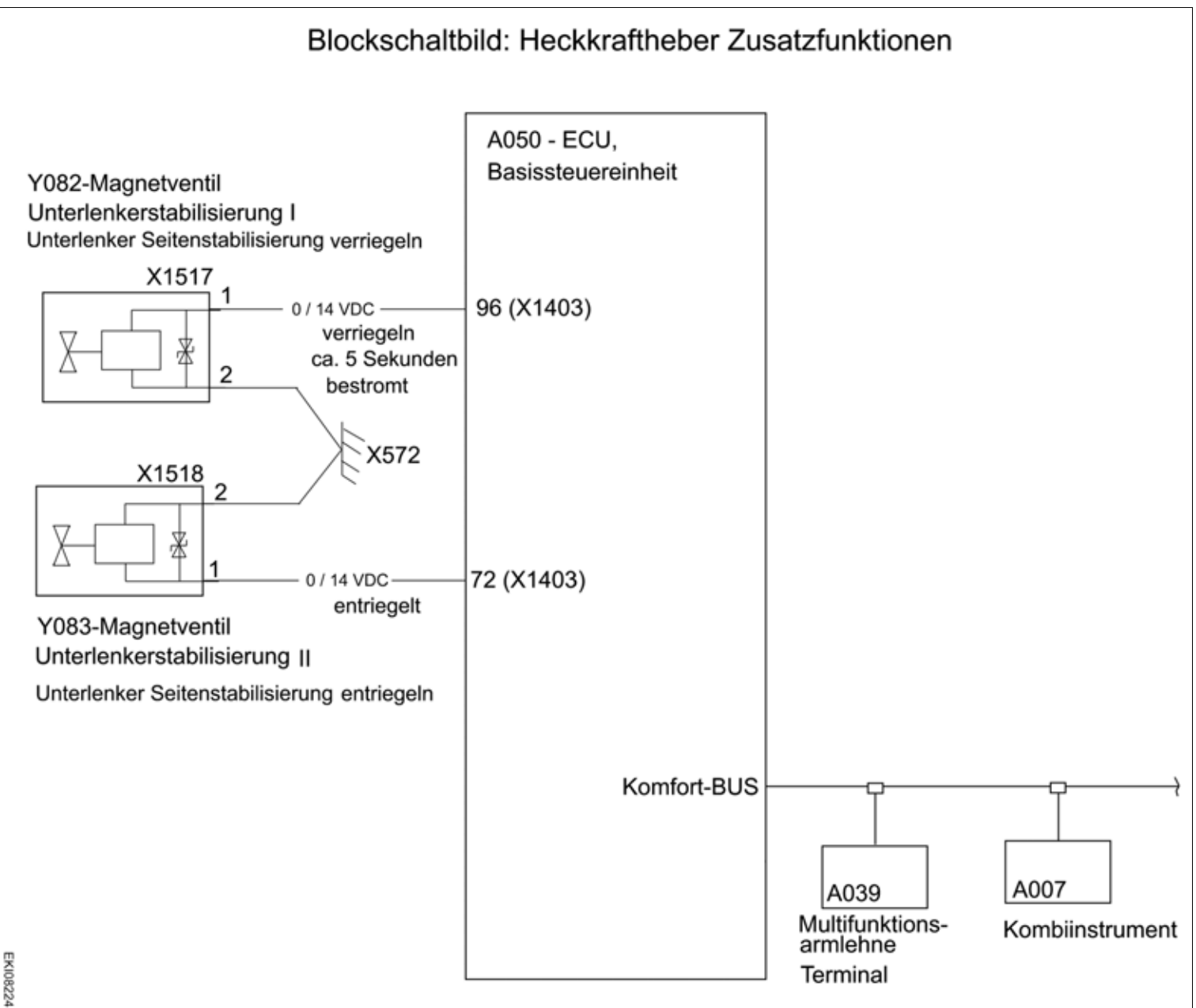


Fig. 68.

Lower link lateral stabiliser



Prerequisite for this measurement:

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

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-

T000429
Version 4
04-09-2009

111

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)

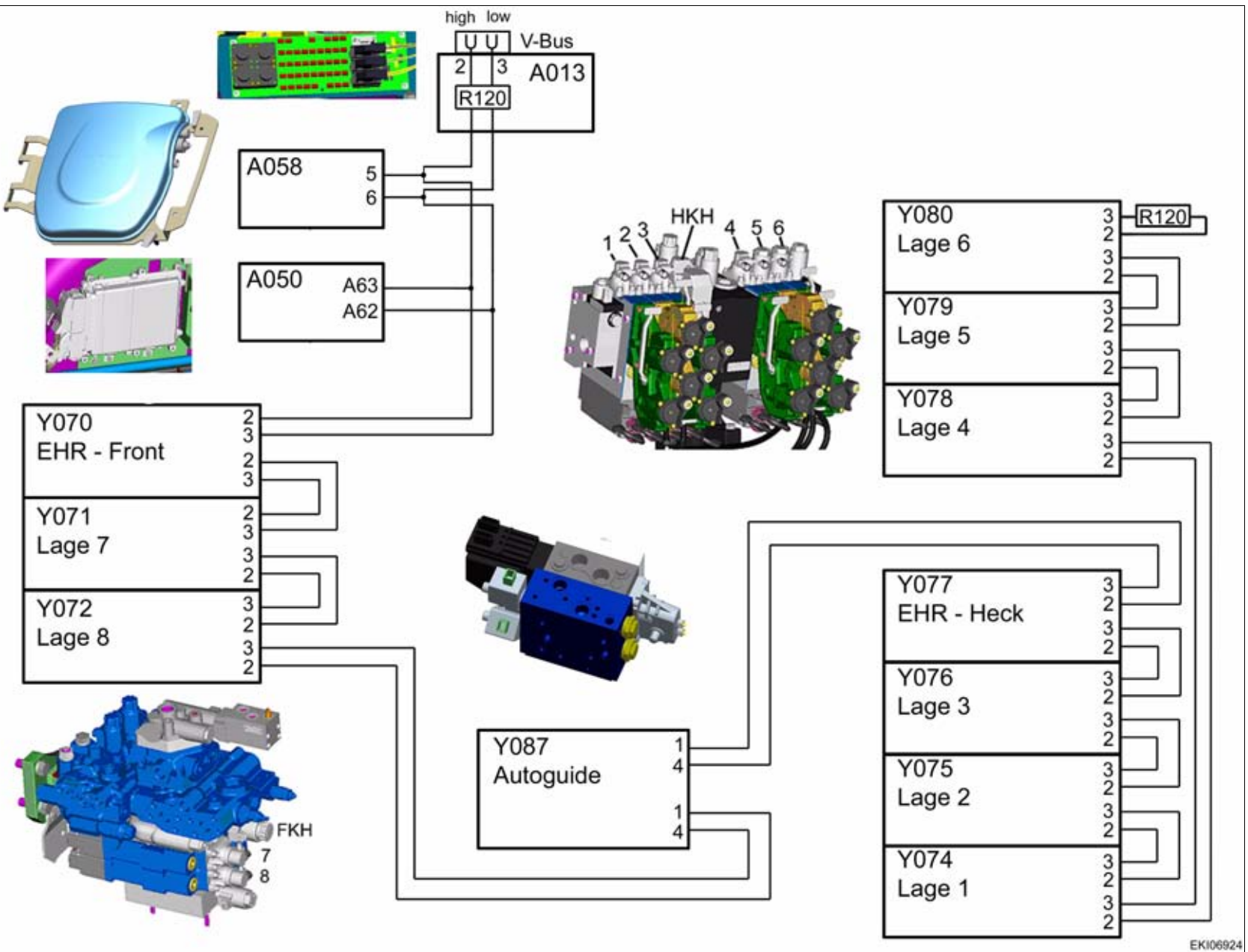


Fig. 69.

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-

T000435
Version 4
04-09-2009

113

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

Fig. 70.

1002001

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 component
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 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	EPC front, EPC rear, electr. auxiliary 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

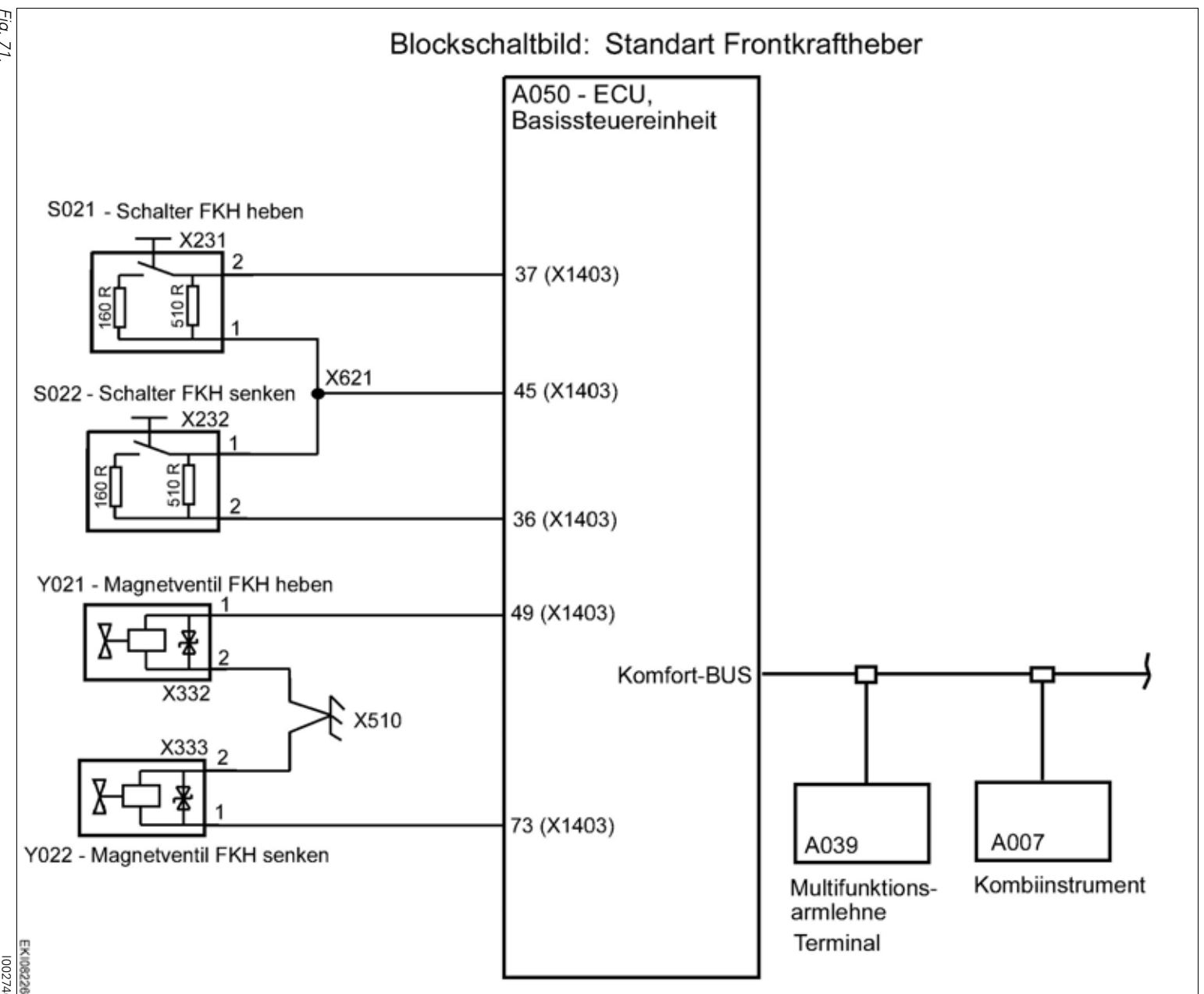


Fig. 71.

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](#)

116

T000436
Version 3
04-09-2009

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-

**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
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



1001895

**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 50°C – 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 component
		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"

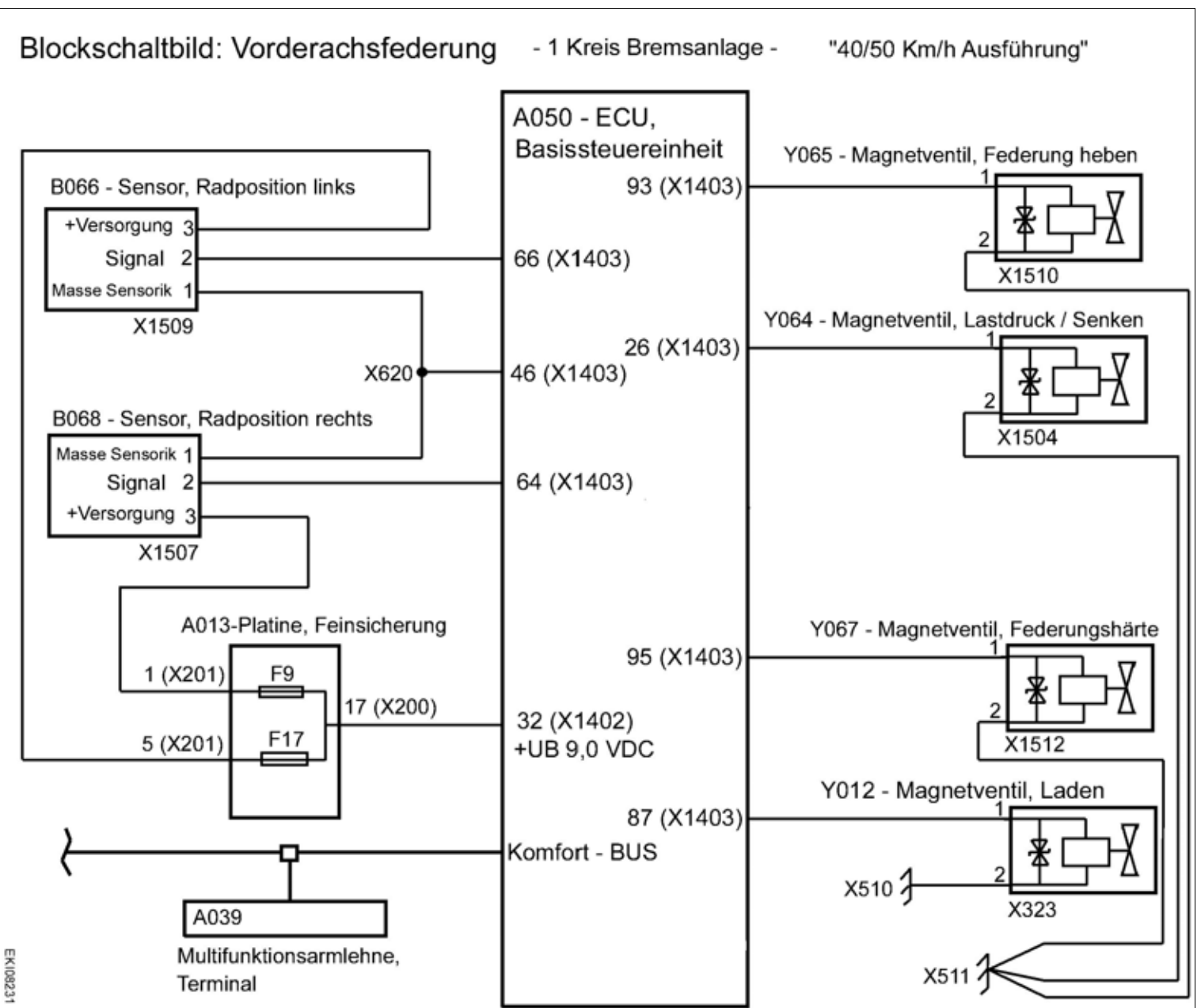


Fig. 73:

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

122

T000439
Version 4
04-09-2009

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-

**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
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

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-

T000439
Version 4
04-09-2009

125

tion"



1001896

.....

**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
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)					

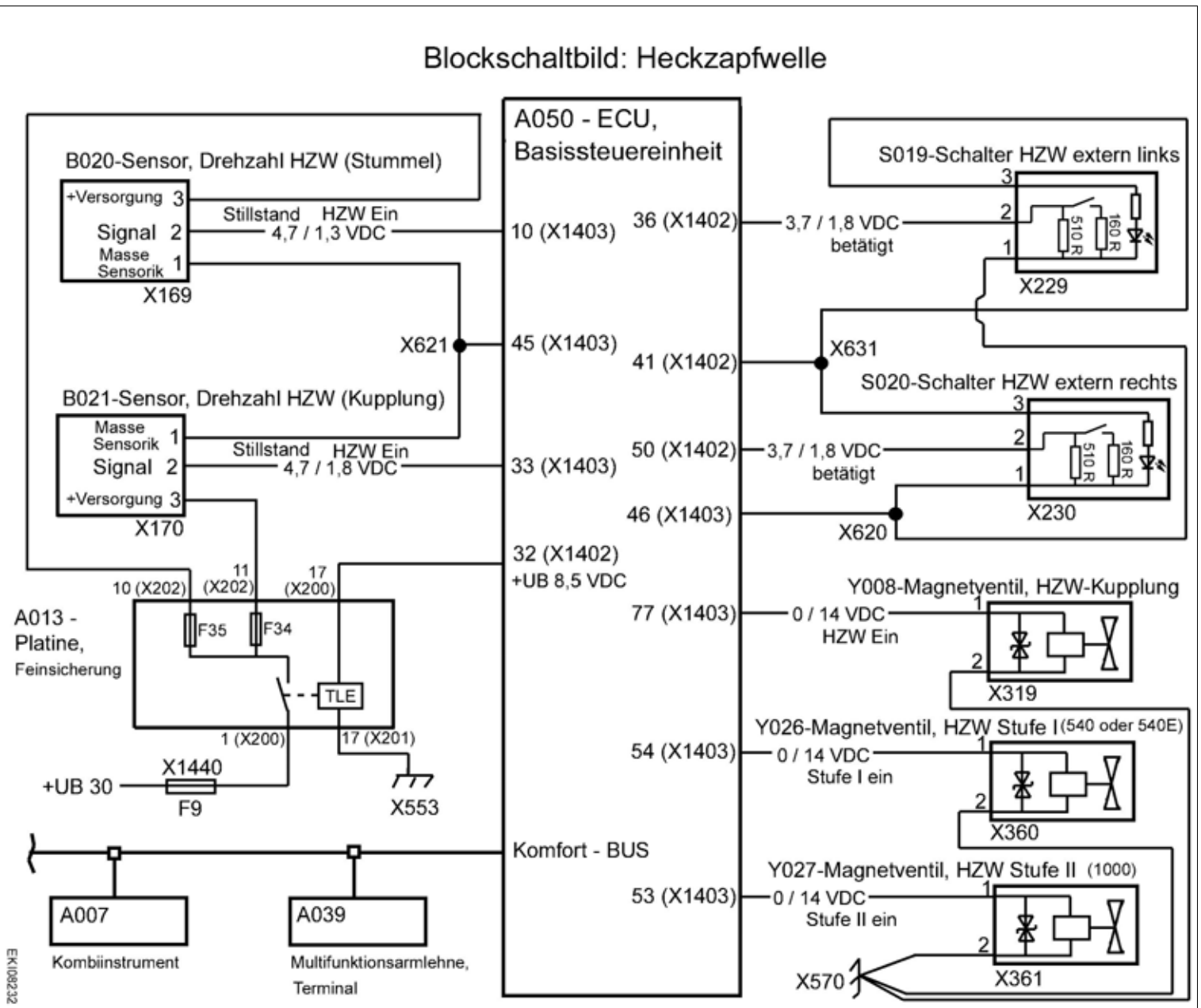
Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
95 (X1403)	Actuation Ignition ON. Engine is running				
(digital output)	Note: To lock the front axle suspension, briefly press the "Lock suspension" button for less than 3 seconds. The front axle 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



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-

T000442
Version 3
04-09-2009

131



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 component
PWM signal		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](#)



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)

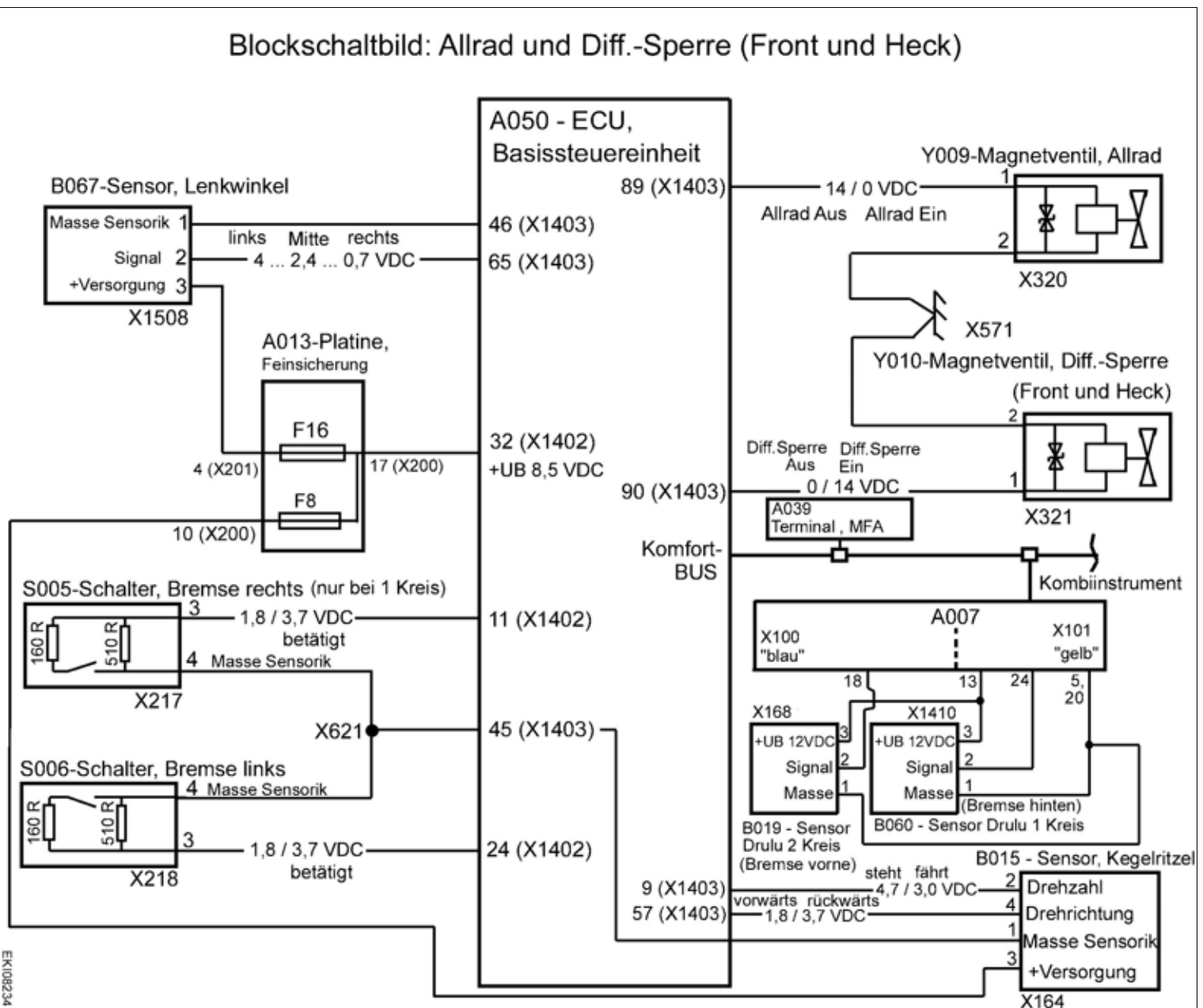


Fig. 77.

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

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-

T000445
Version 3
04-09-2009

137

**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 component
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	2.4 VDC	0 VDC	6.7 VDC
		Note: Set the wheels straight and advance the tractor slowly, the steering wheel will find the centre position.			
		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 component
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 output		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 output		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)

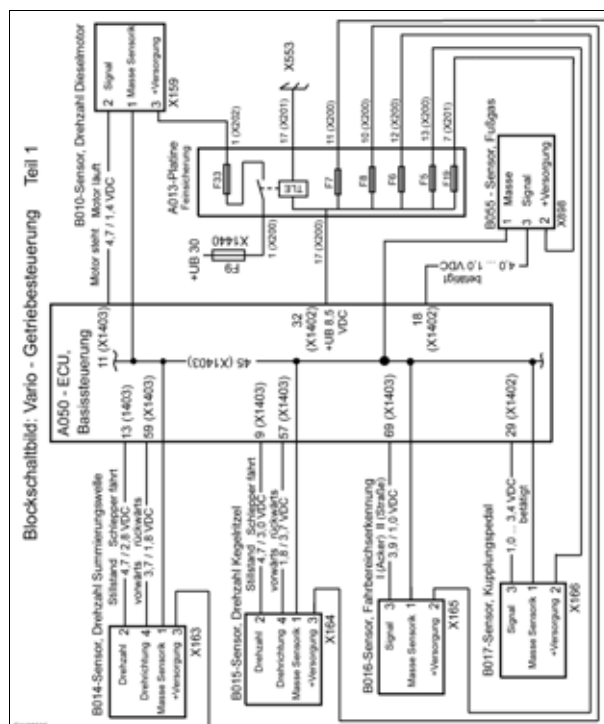
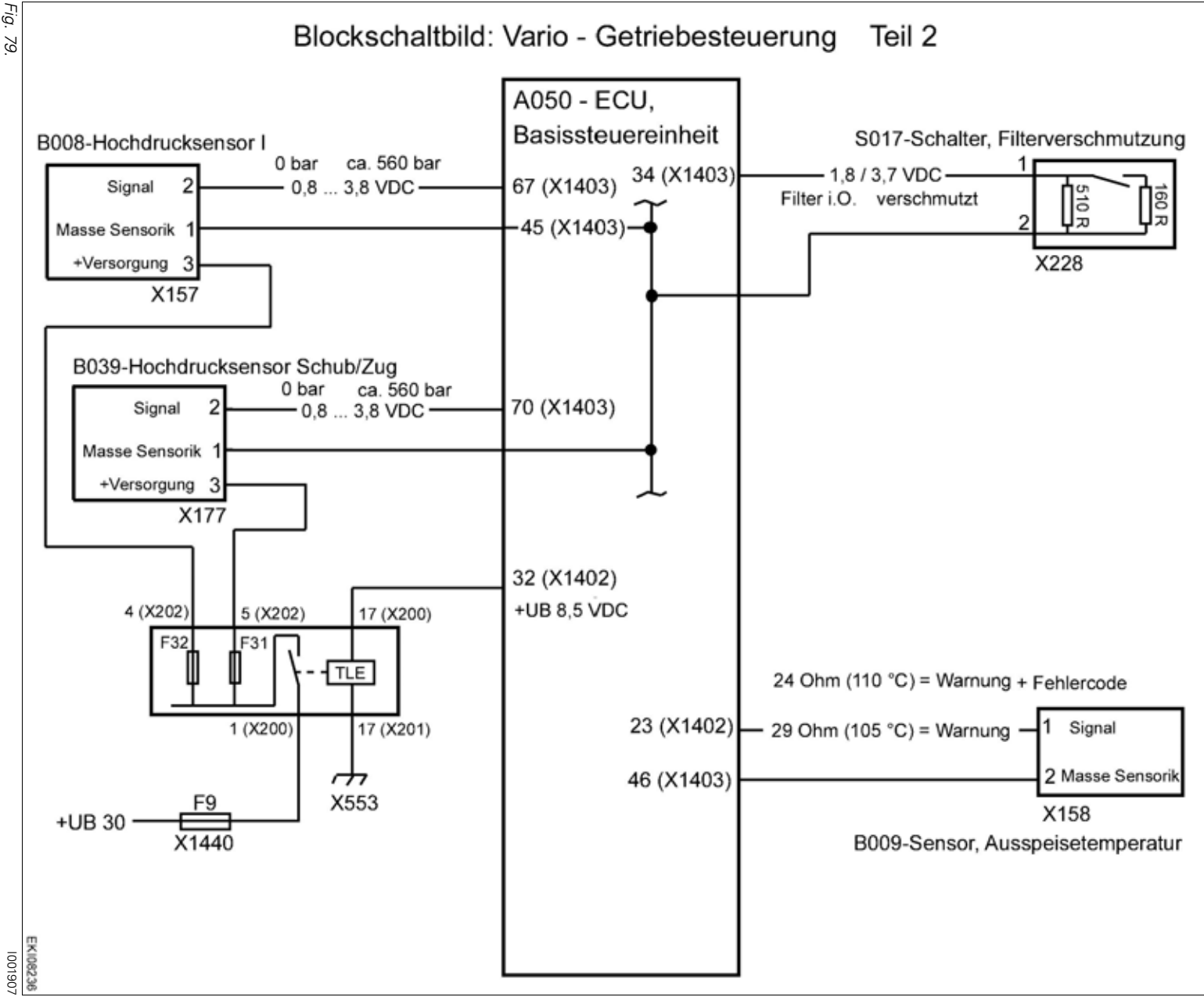


Fig. 78.

1001906

Circuit diagram: Vario transmission control (Part 2)

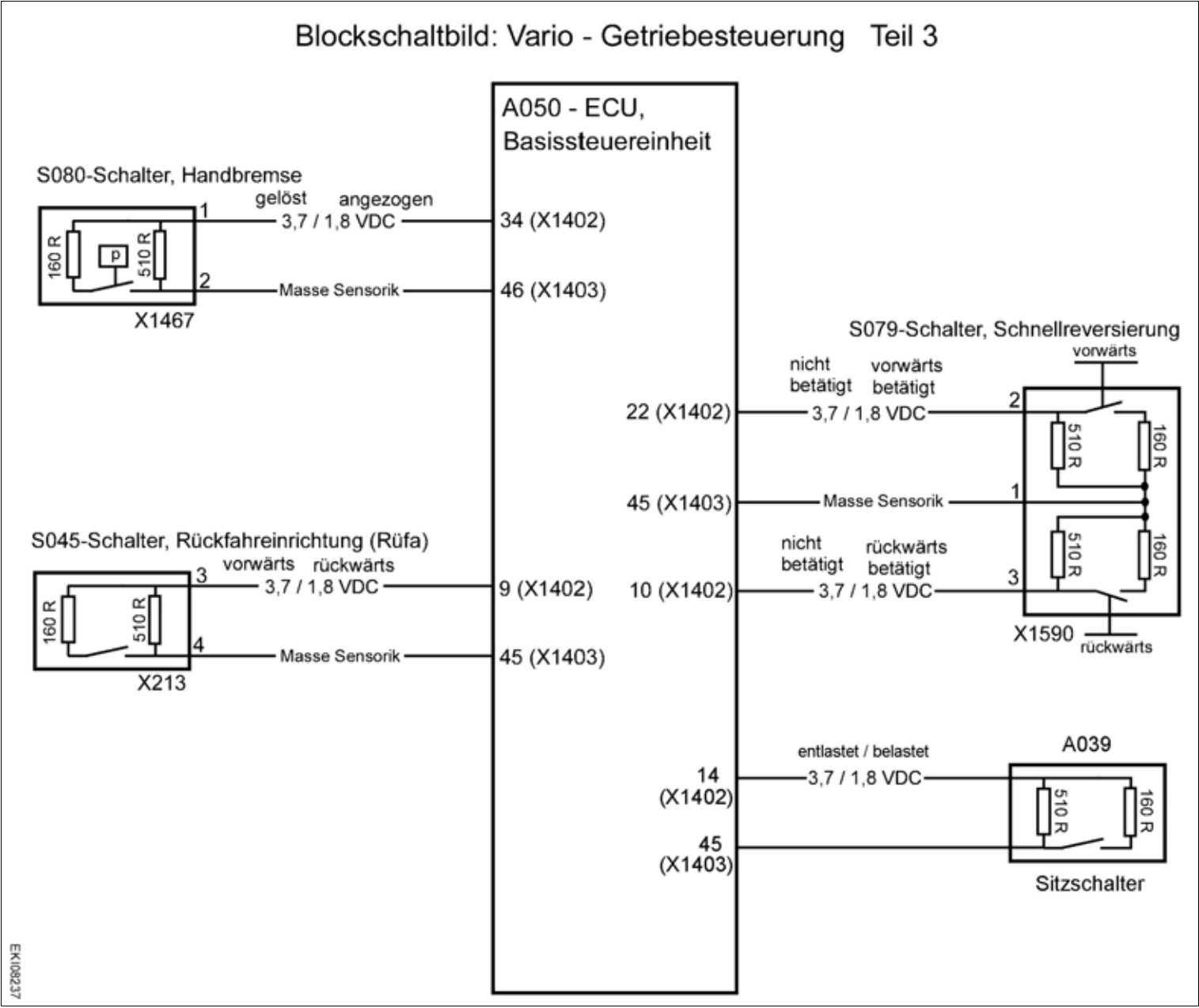


919 .. 0101-1000
919 .. 1001-
922 .. 0101-1000
922 .. 1001-
925 .. 0101-1000

925 .. 1001-
928 .. 0101-1000
928 .. 1001-
931 .. 0101-1000
931 .. 1001-

934 .. 0101-1000
934 .. 1001-

Circuit diagram: Vario transmission control (Part 3)



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

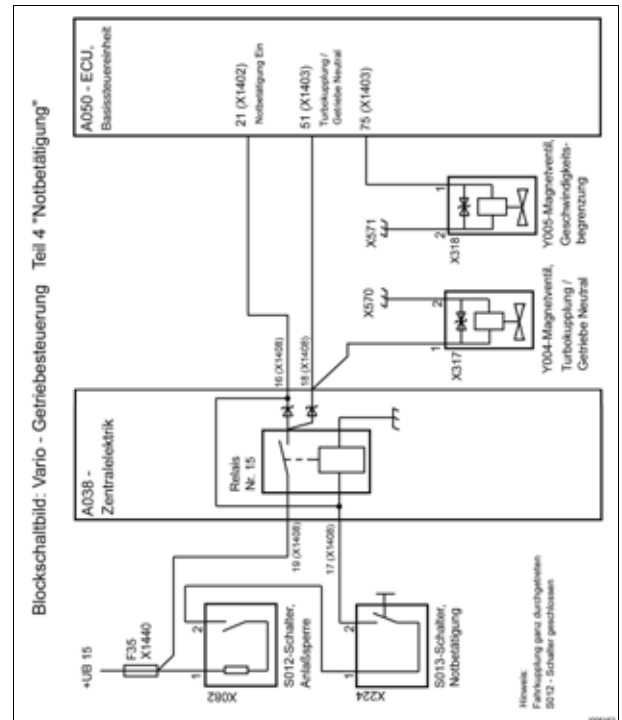


Fig. 81.

1006163

Circuit diagram: Vario transmission control (Part 5)

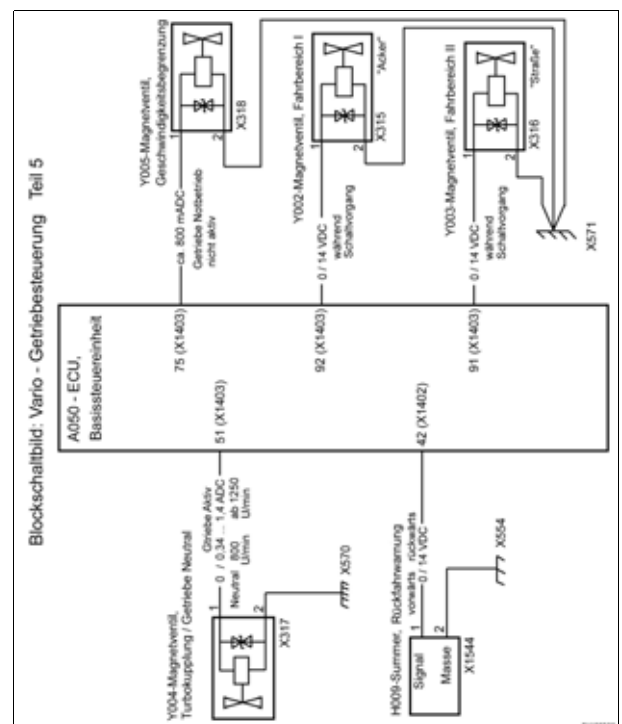
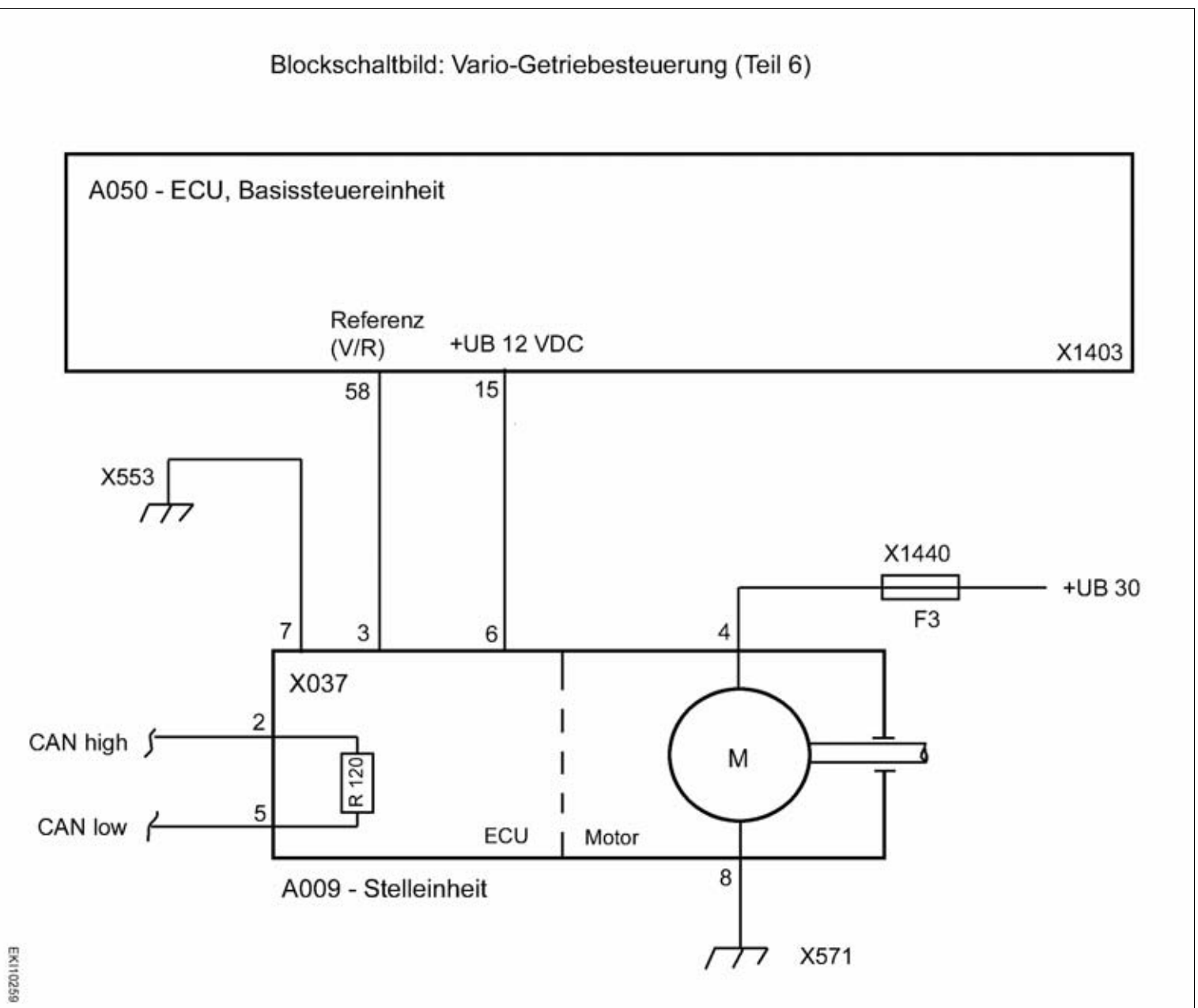


Fig. 82.

1001910



1009463

**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 component
		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 component
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 component
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		

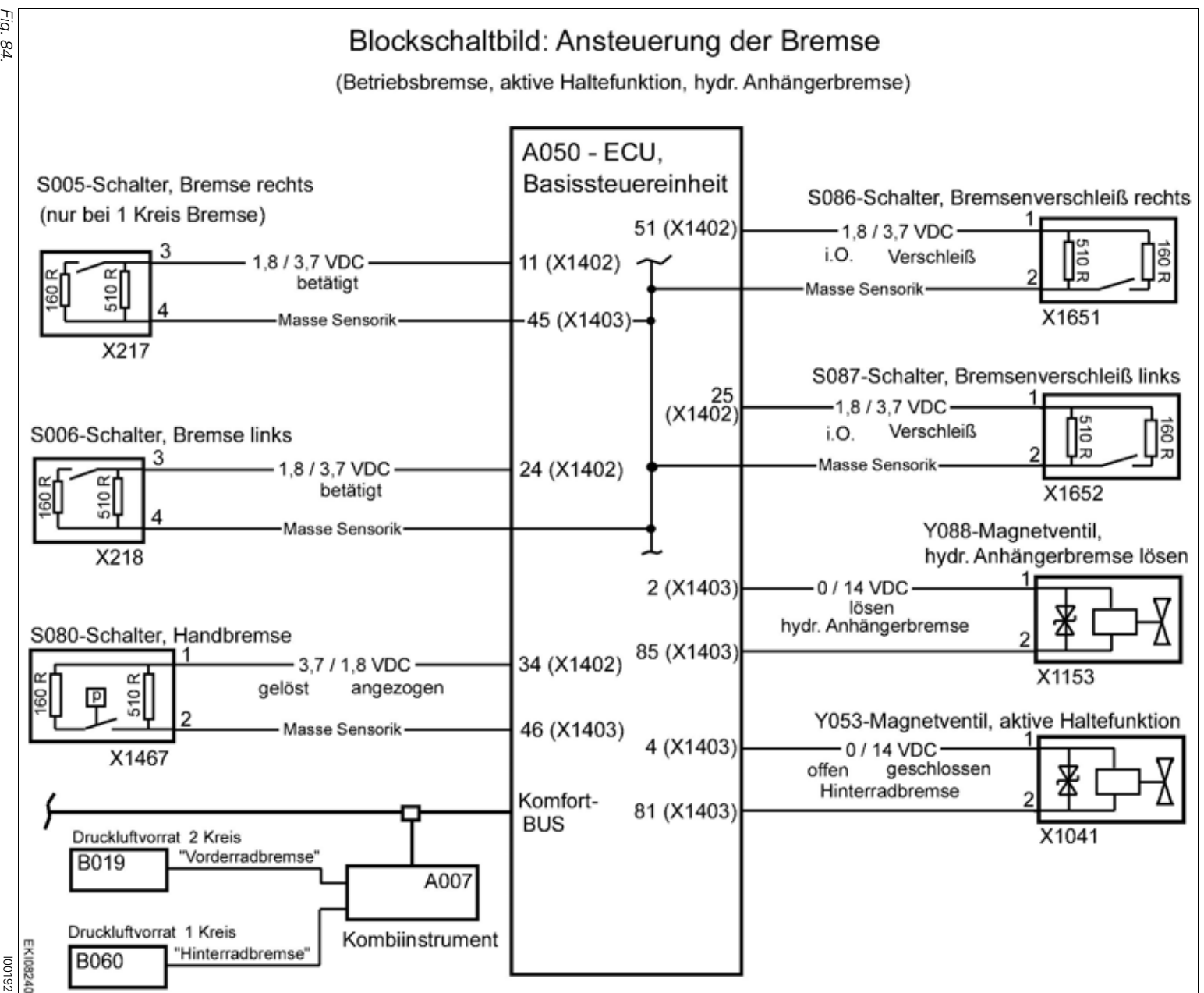
Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
S079 - Switch, steering column (Earth pin 45)					
22 (X1402)	Signal (forwards) Ignition ON.				
Digital input		Switch not actuated	3.7 VDC	6.1 VDC	0 VDC
		Switch actuated forwards			
		Switch actuated 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 output	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 output	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)



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

152

T000449
Version 3
04-09-2009

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-

**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 component
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 component
PWM signal (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	-	-

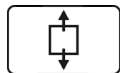
NOTE: [see §19](#)

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 gyro-compass) and connect X1633 separation point.



On cab ceiling.

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

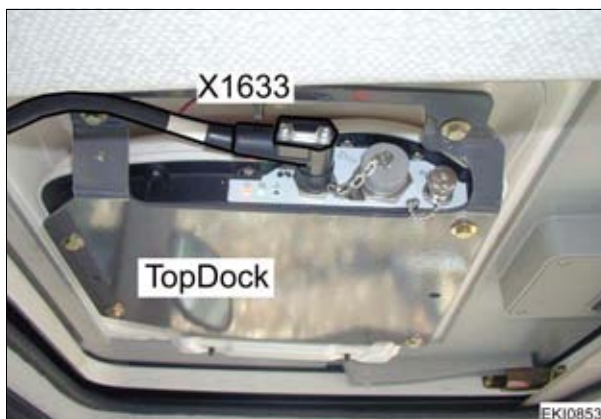


Fig. 87.

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)

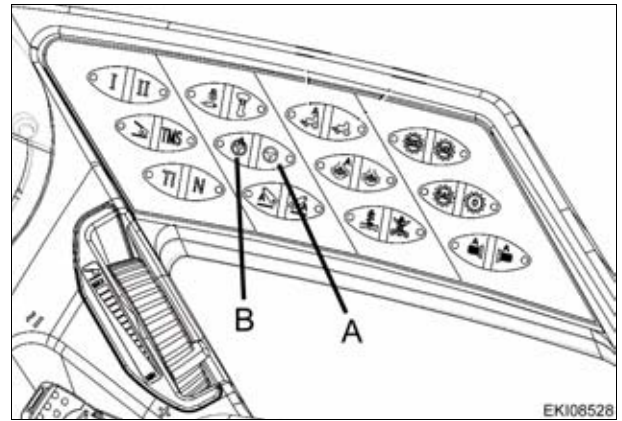


Fig. 88.

EKI08528
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.

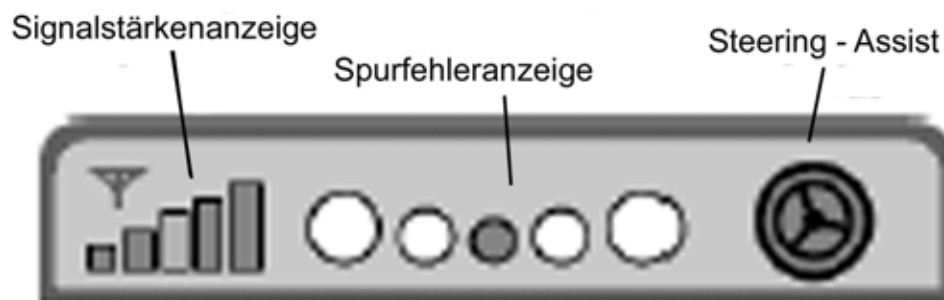
EKI05647
I001366

Fig. 90.

EKI05871
I001367

Balken	0	1	2	3	4	5
Grafik						

Fig. 91.

EKI05872
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.

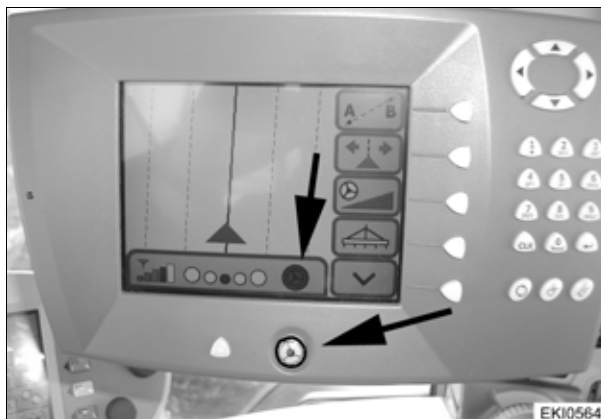


Fig. 92.

EKI05648
1001369

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

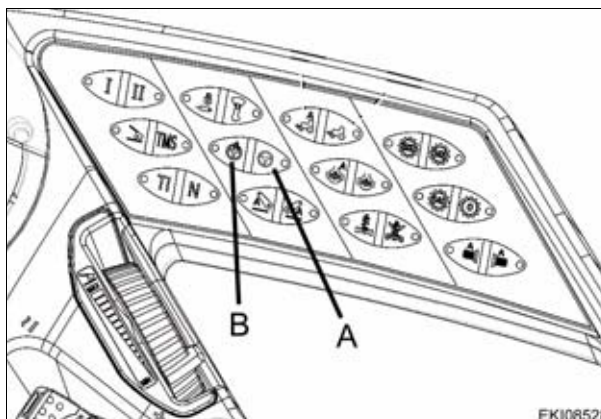


Fig. 93.

EKI08528
1002339

Conditions for engaging Autoguide

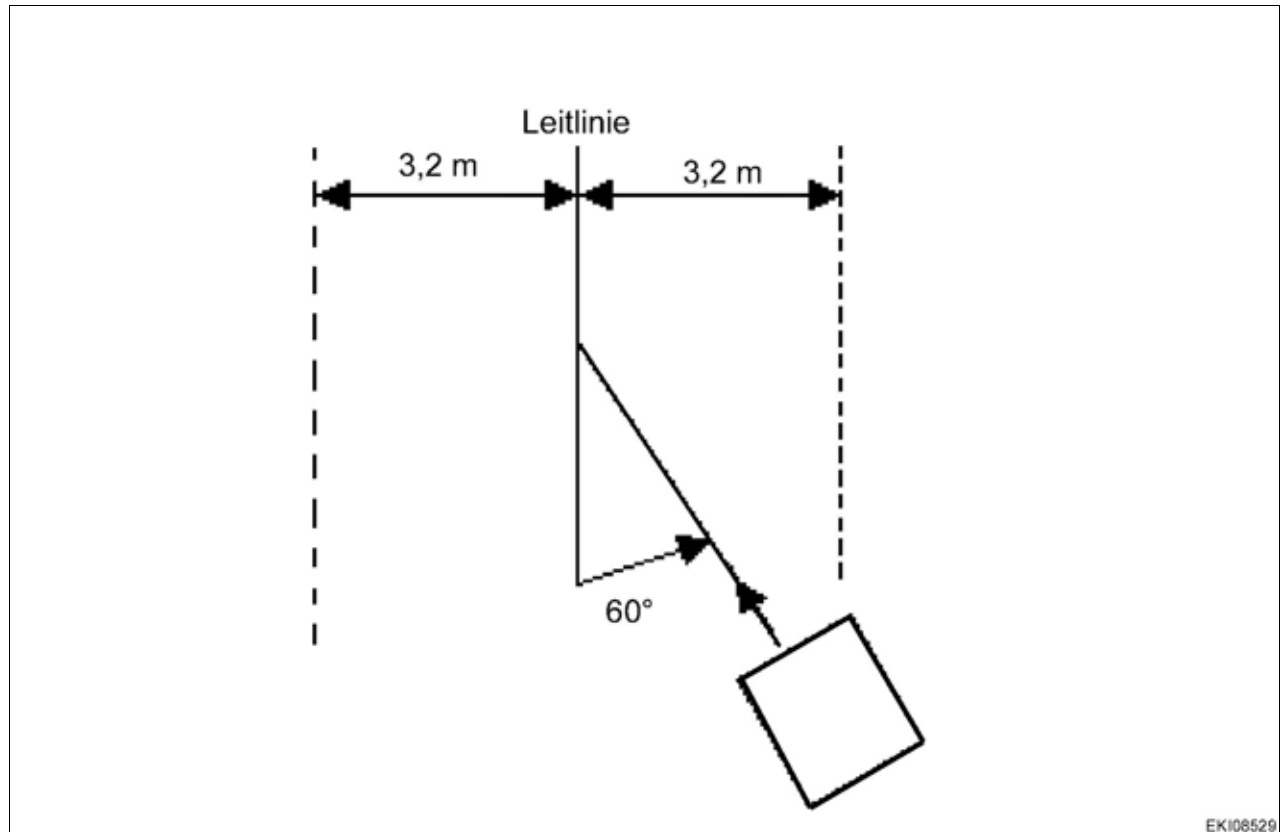


Fig. 94.

EKI08529

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.

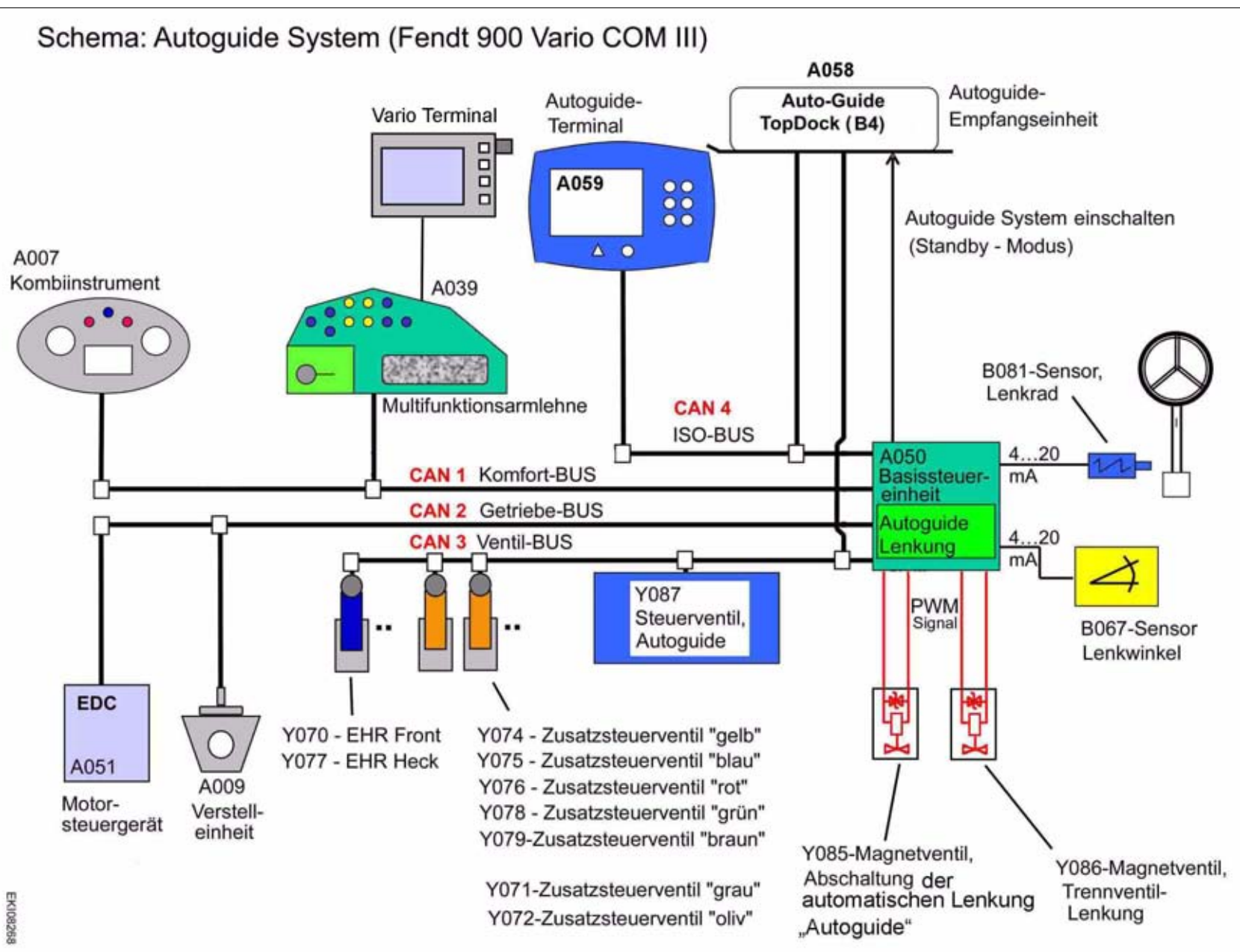


Fig. 95.

EKI05649

I001371

Fig. 96.



Circuit diagram: Autoguide "auto steering assist system"

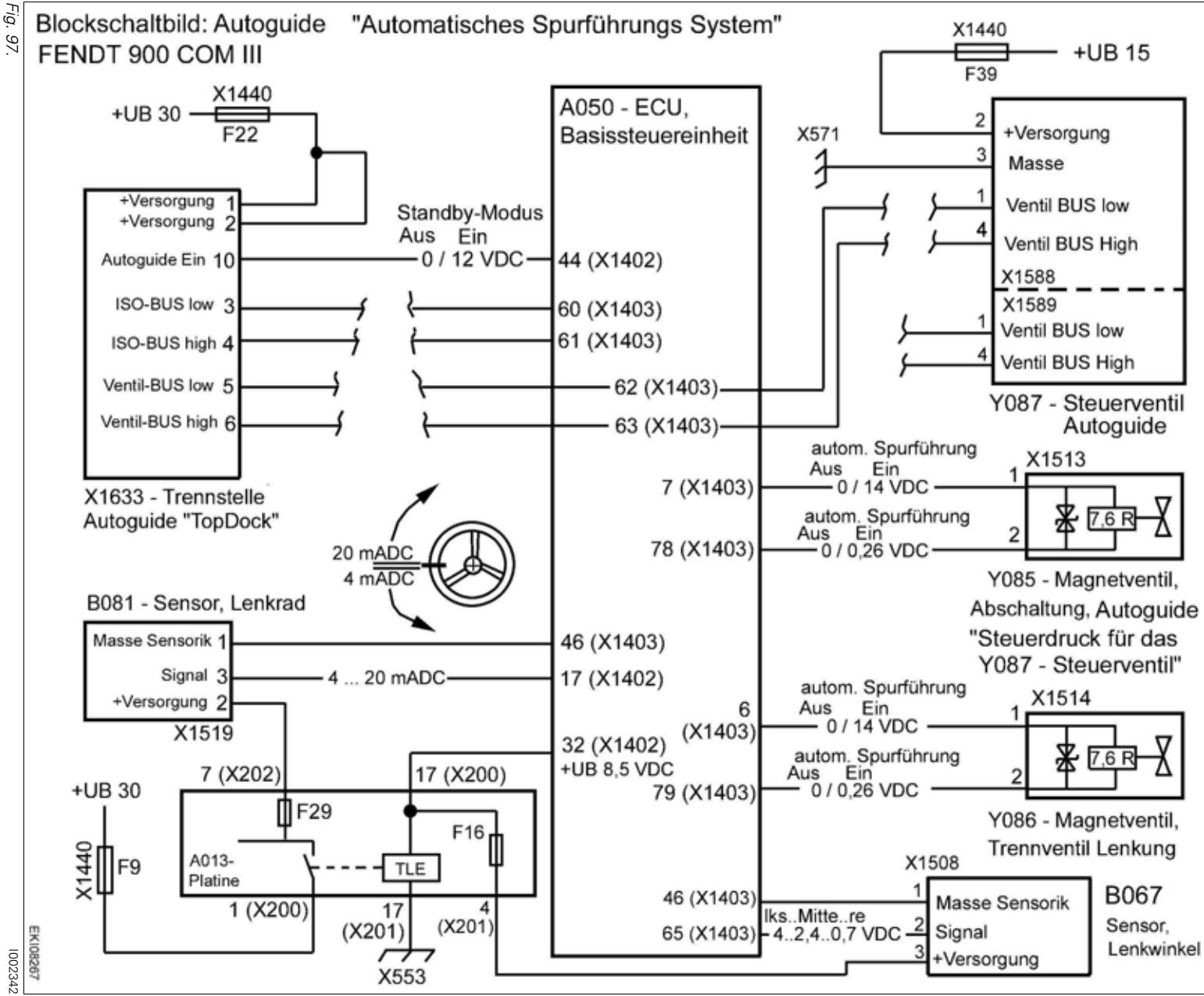


Fig. 97.

EK108267
1002342

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-

T000461
Version 3
27-11-2009

161

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

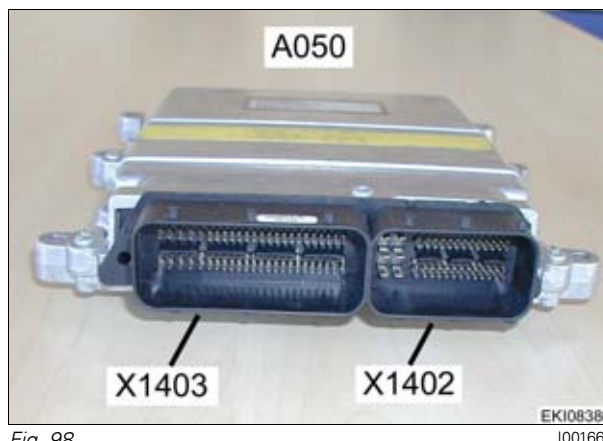


Fig. 98.

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).

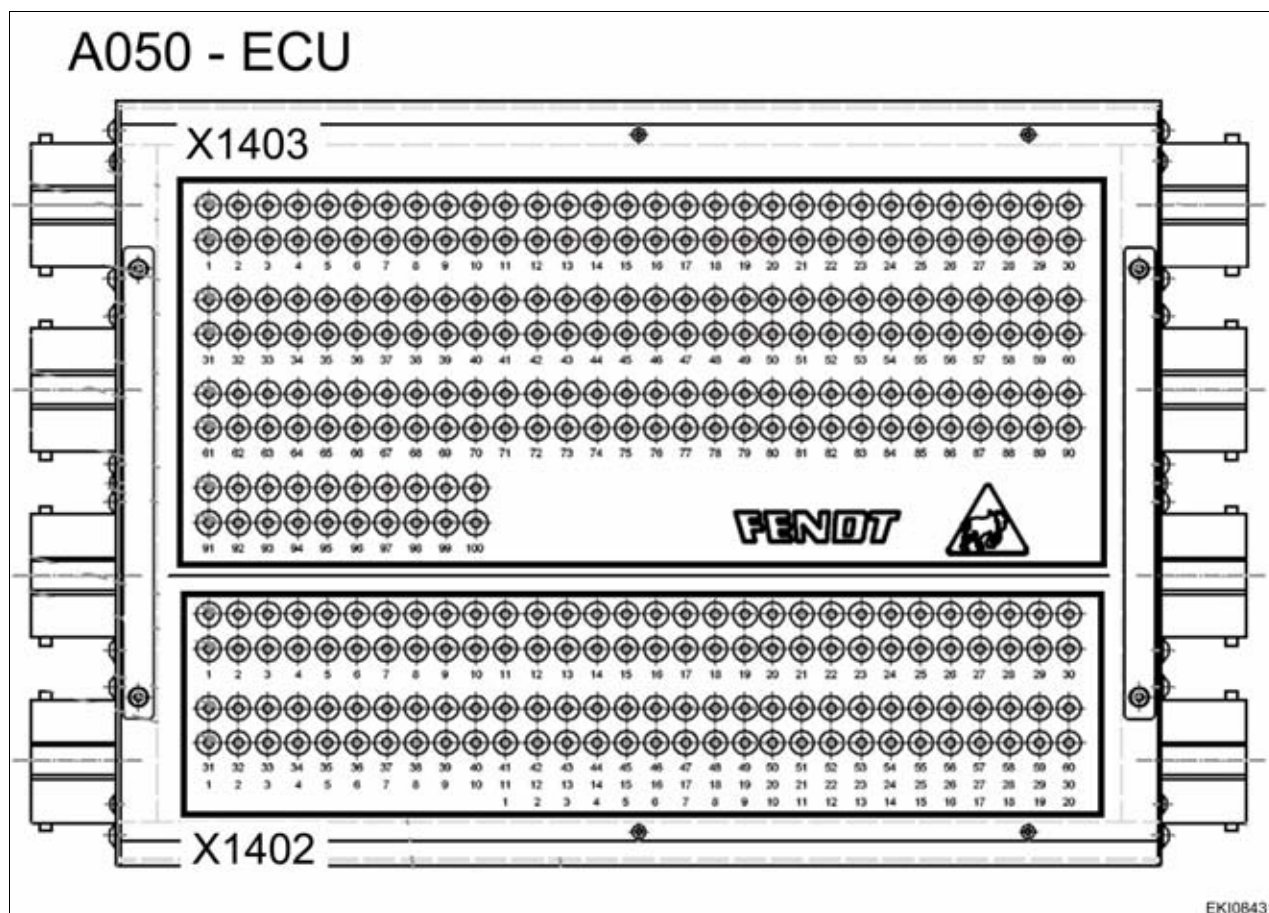


Fig. 99.

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

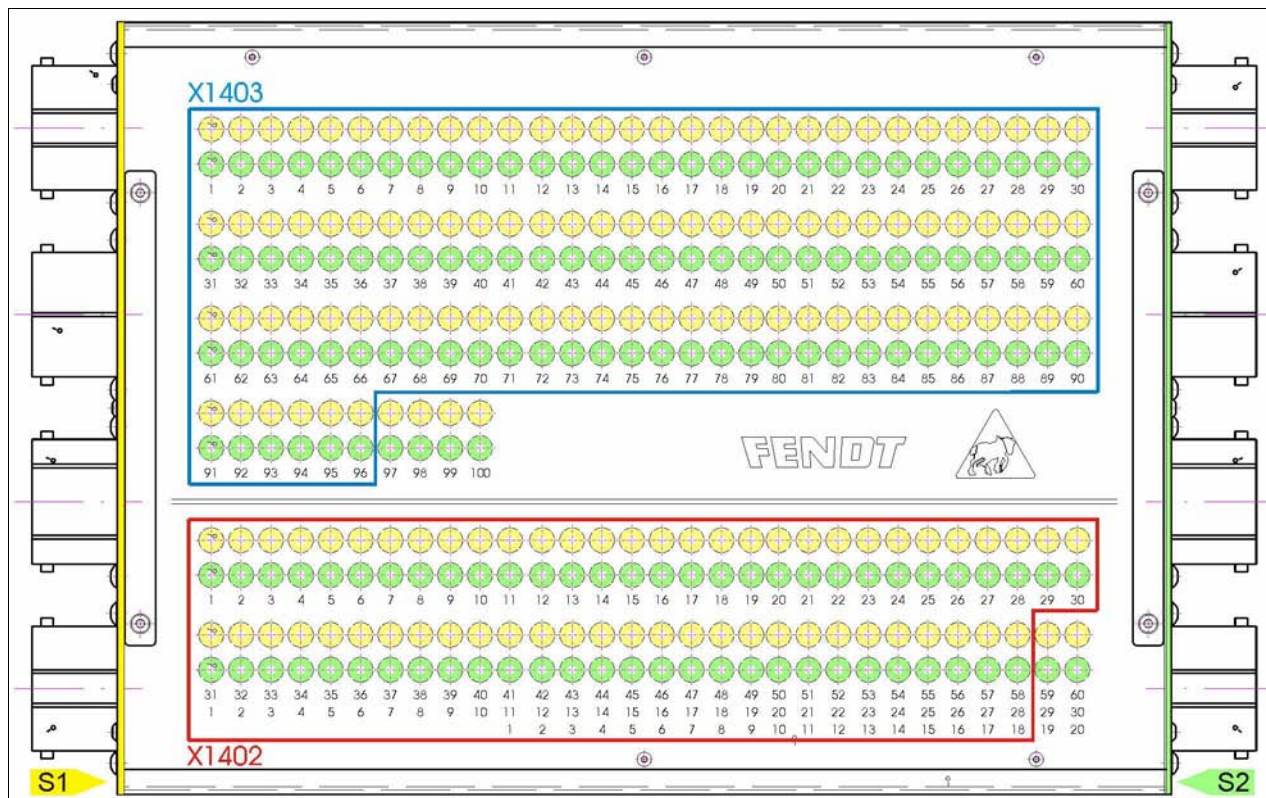


Fig. 13.

1007438

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.

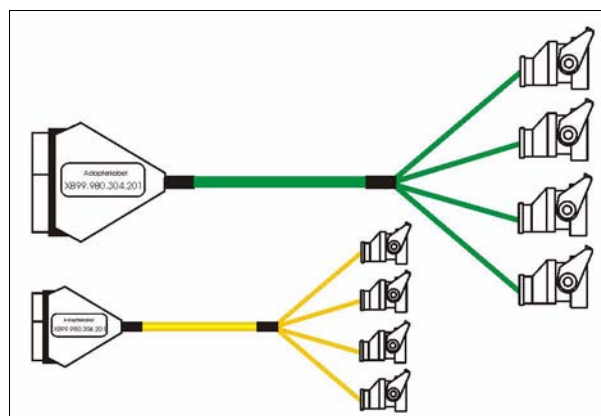


Fig. 14.

1007447

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

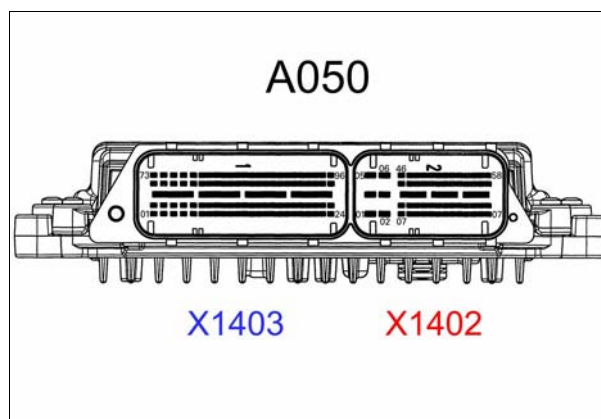


Fig. 15.

1007431

NOTE: see also 57, Page 8 "Various measurement possibilities using the adapter box (160-pin)"



Fig. 101.

1003564



Fig. 102.

1003565



Fig. 103.

I003566

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-

T001207
Version 1
07-11-2007

167

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

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

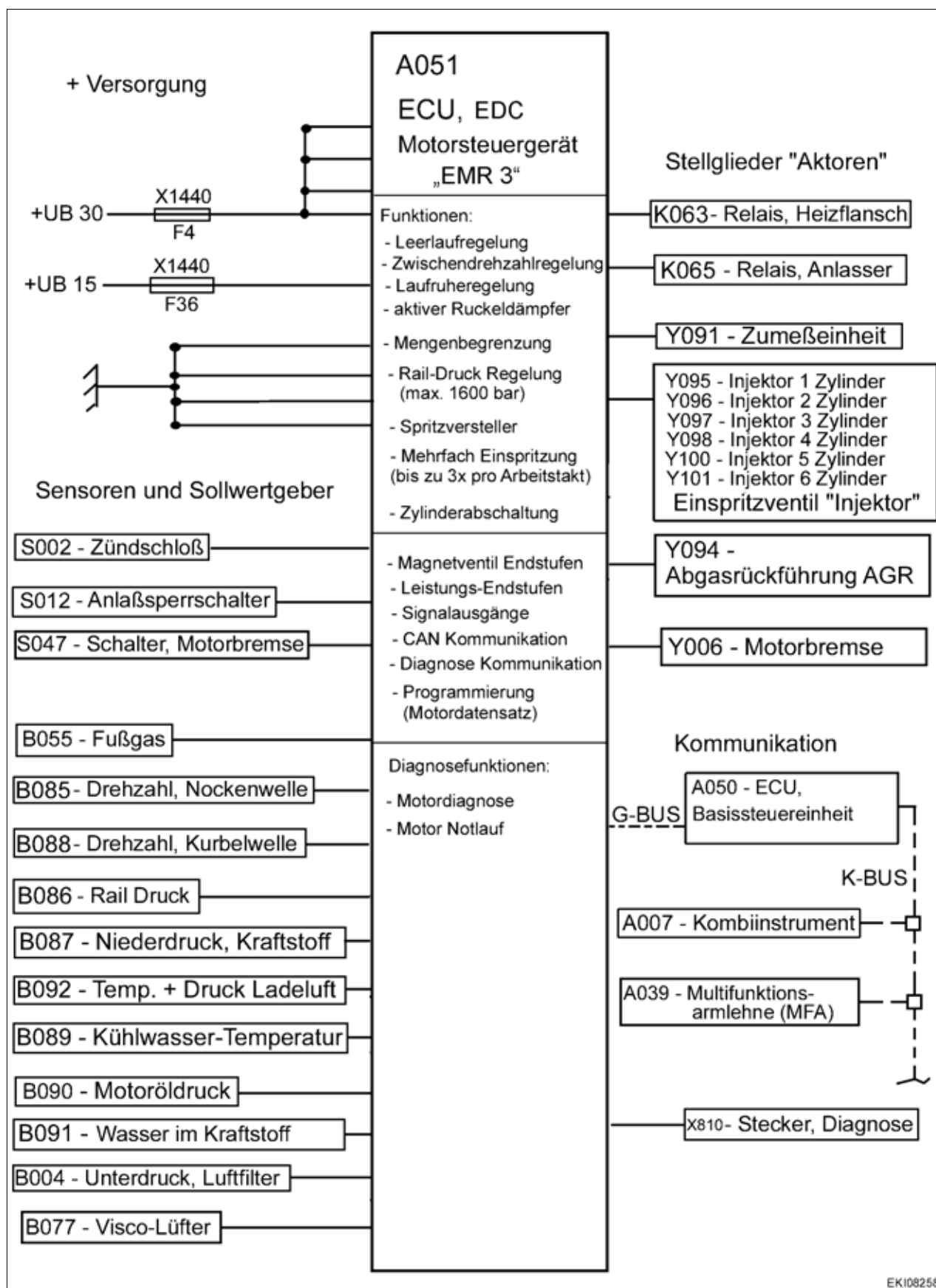


Fig. 104.

EK108258

1002007

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	12 VDC Approx. 13-14 VDC	Engine OFF, ignition OFF Engine is running	Fuse F4 in X1440 fuse holder or in wiring set see also circuit diagram: supply to electronics
	3			
	8			
	9			
Electronics earth	5			
	6			
	10			
	11			
+ supply	2	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).
	3			
	8			
	9			
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	12 VDC Approx. 13-14 VDC	Engine OFF, ignition ON	Fuse F36 in X1440 fuse holder or in wiring set see also circuit diagram: supply to electronics
			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).

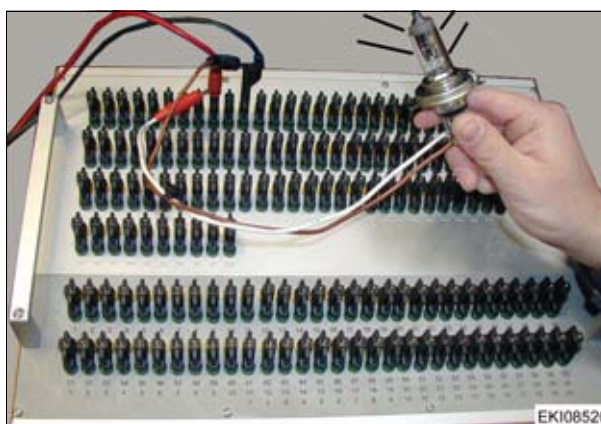


Fig. 105.

EKI08520
1002216

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 component
+ 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 <i>see §31</i> 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					
Pin	description	Signal type/condition	Signal	Wire interrupted	
				Signal from ECU	Signal from component
		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					
Pin	description	Signal type/condition	Signal	Wire interrupted	
				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 too 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					
Pin	description	Signal type/condition	Signal	Wire interrupted	
				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 component
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.

1007496

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.

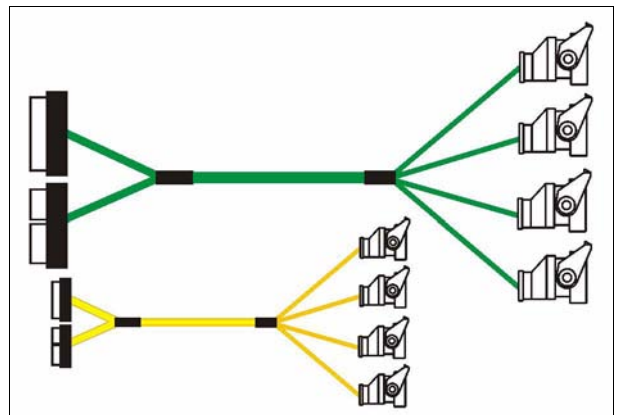


Fig. 17.

1007497

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**.

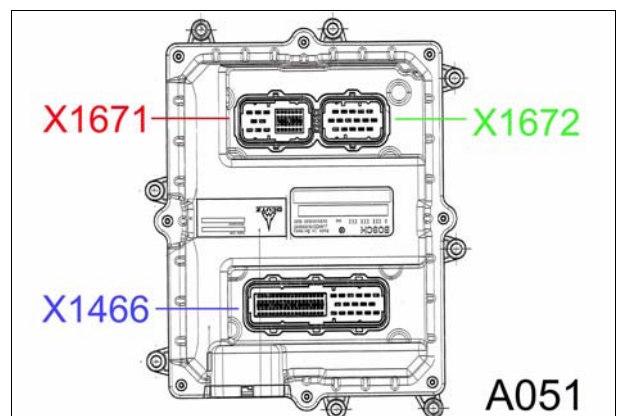


Fig. 18.

1007507

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)

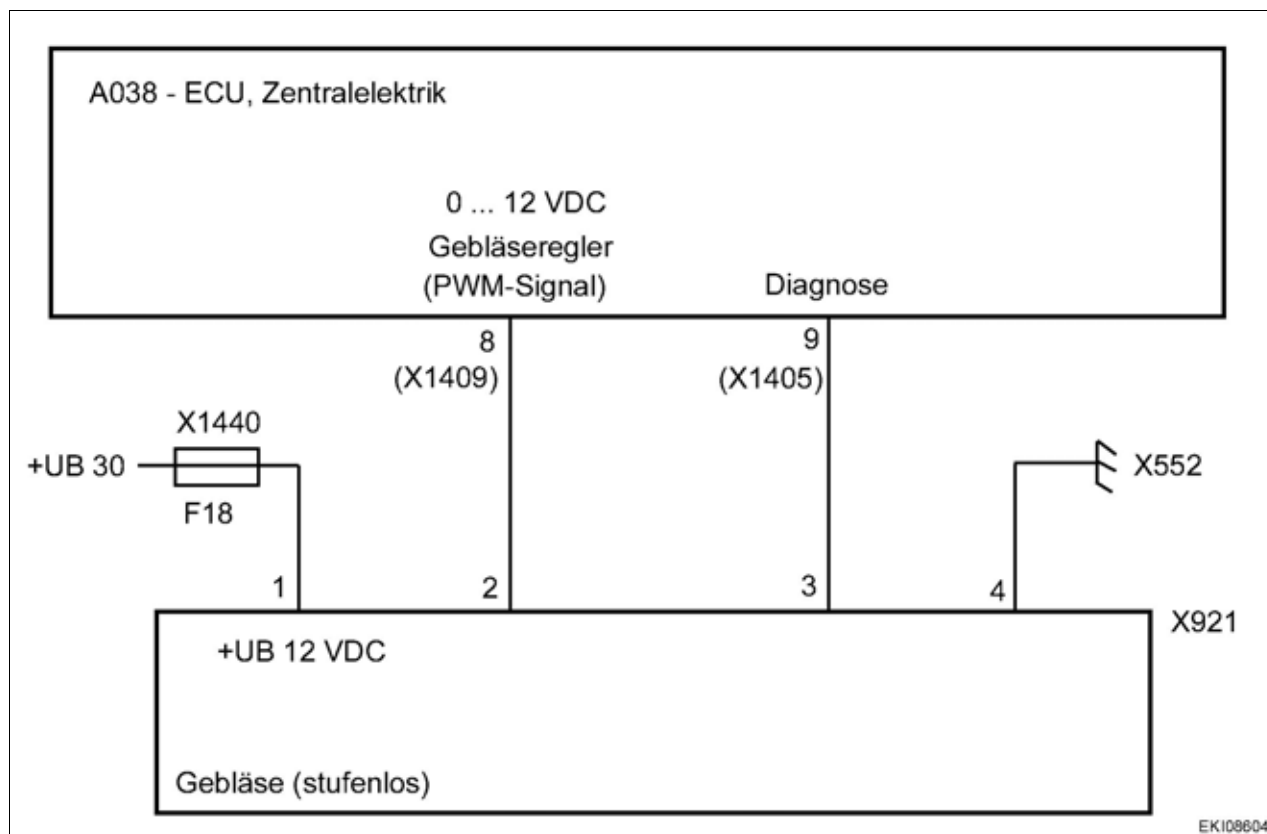


Fig. 107.

1002406

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.

EK108606
I002408

NOTE: see §1
see §2

39 A053 air conditioning unit (sensor, evaporator)

Circuit diagram: evaporator sensor

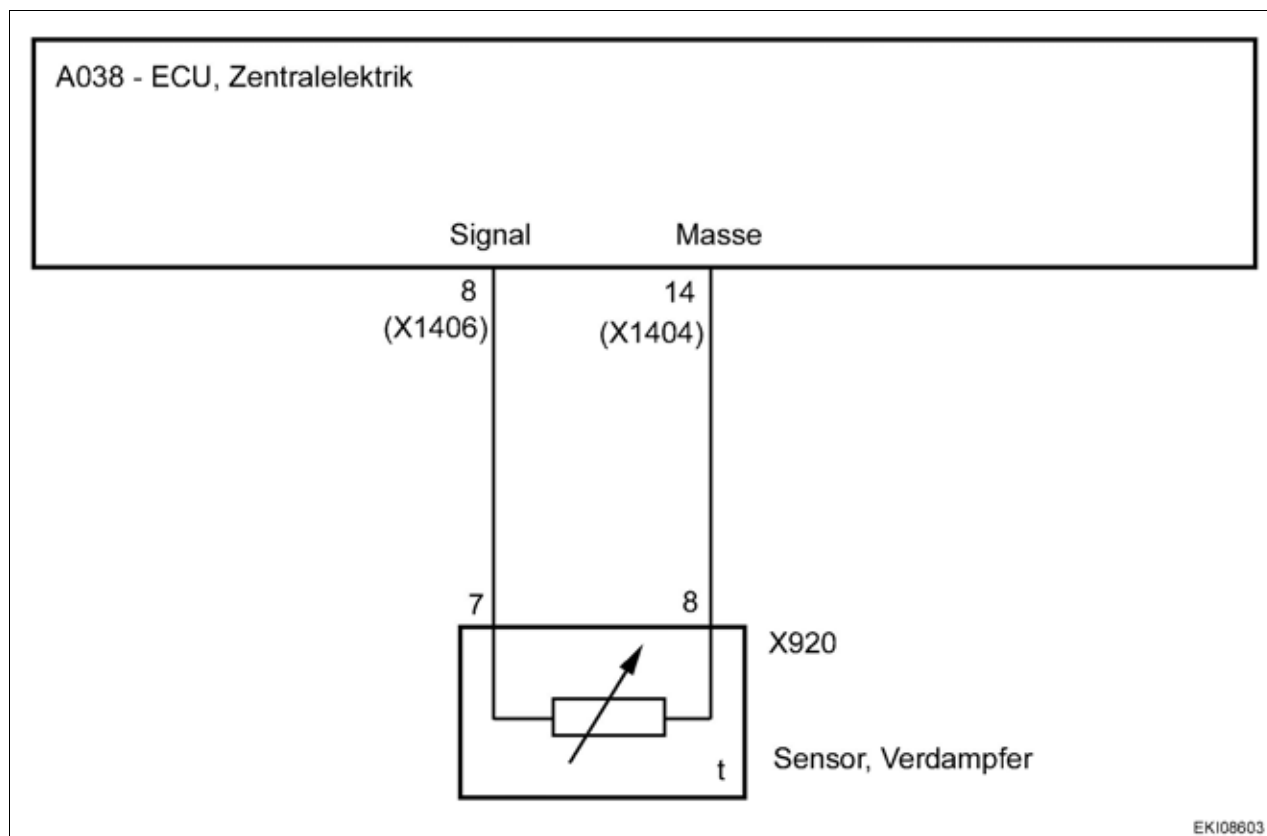


Fig. 109.

1002405

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 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		

NOTE: [see §1](#)
[see §2](#)

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

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

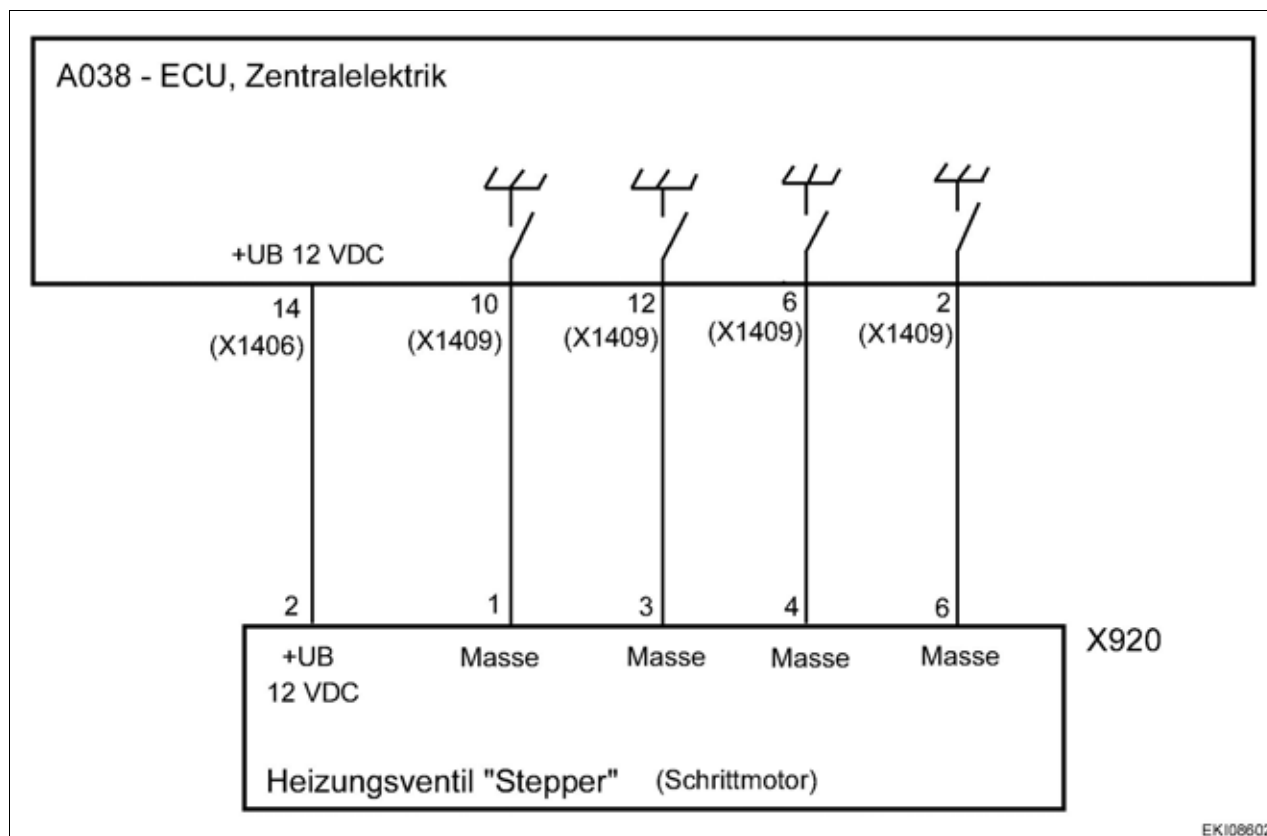


Fig. 110.

EKI08802

1002404

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

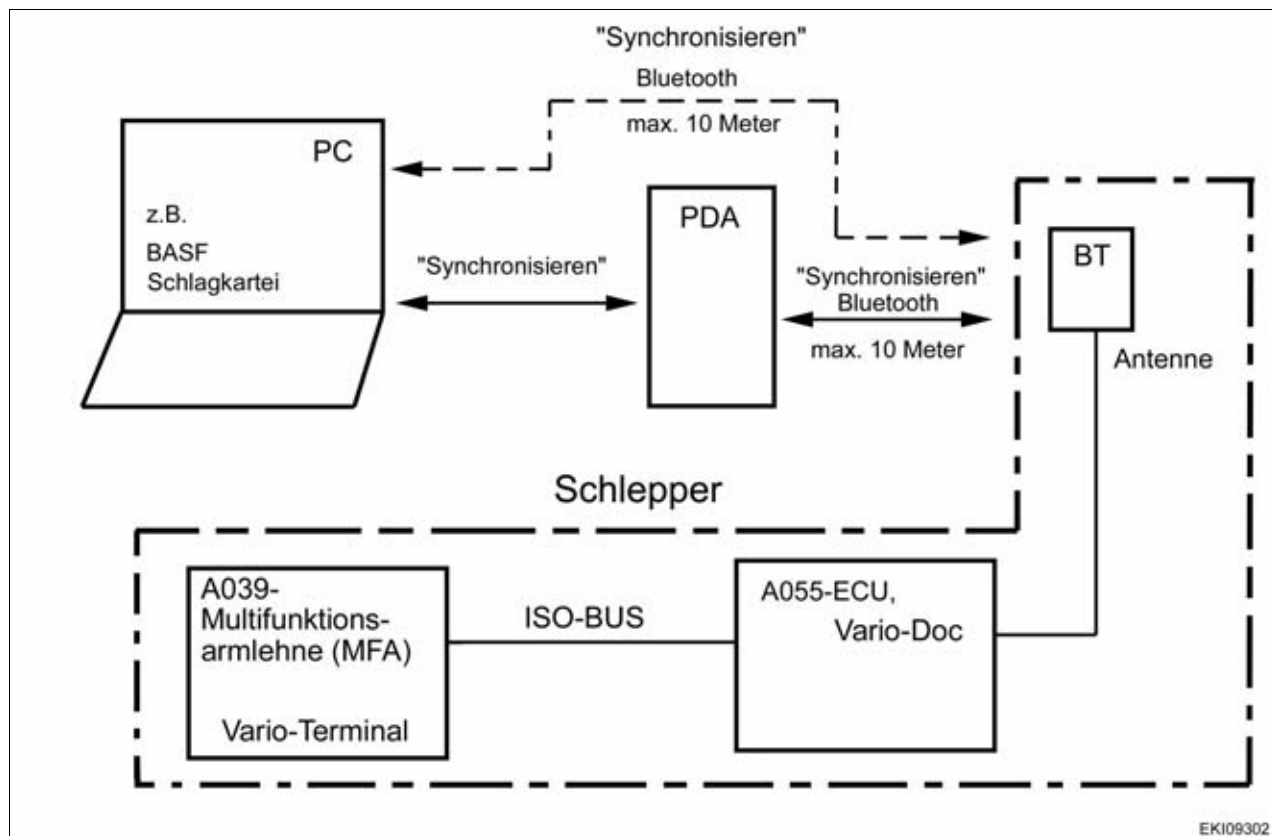


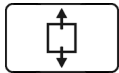
Fig. 111.

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 (hand-held 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.



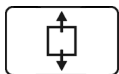
Remove panel, remove protective cap for diagnostic purposes



Fig. 112.

EKI09298
I005509**Aerial (H 339.970.210.020)**

Top right, in cab ceiling



Remove roof lining.

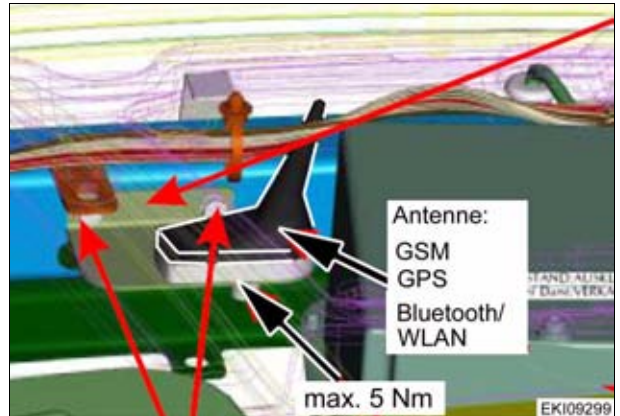


Fig. 113.

EKI09299
I005510**A055 ECU, Vario-Doc**

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

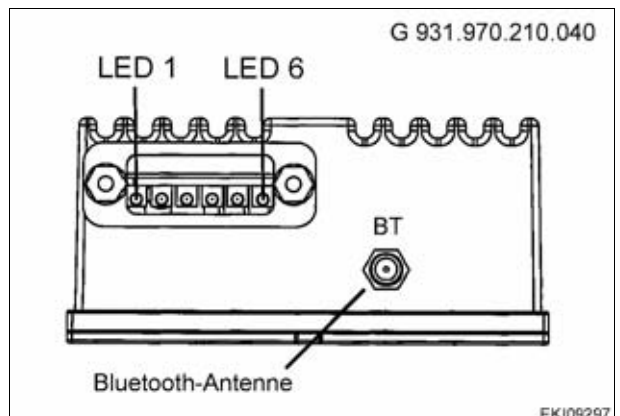


Fig. 114.

EKI09297
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.

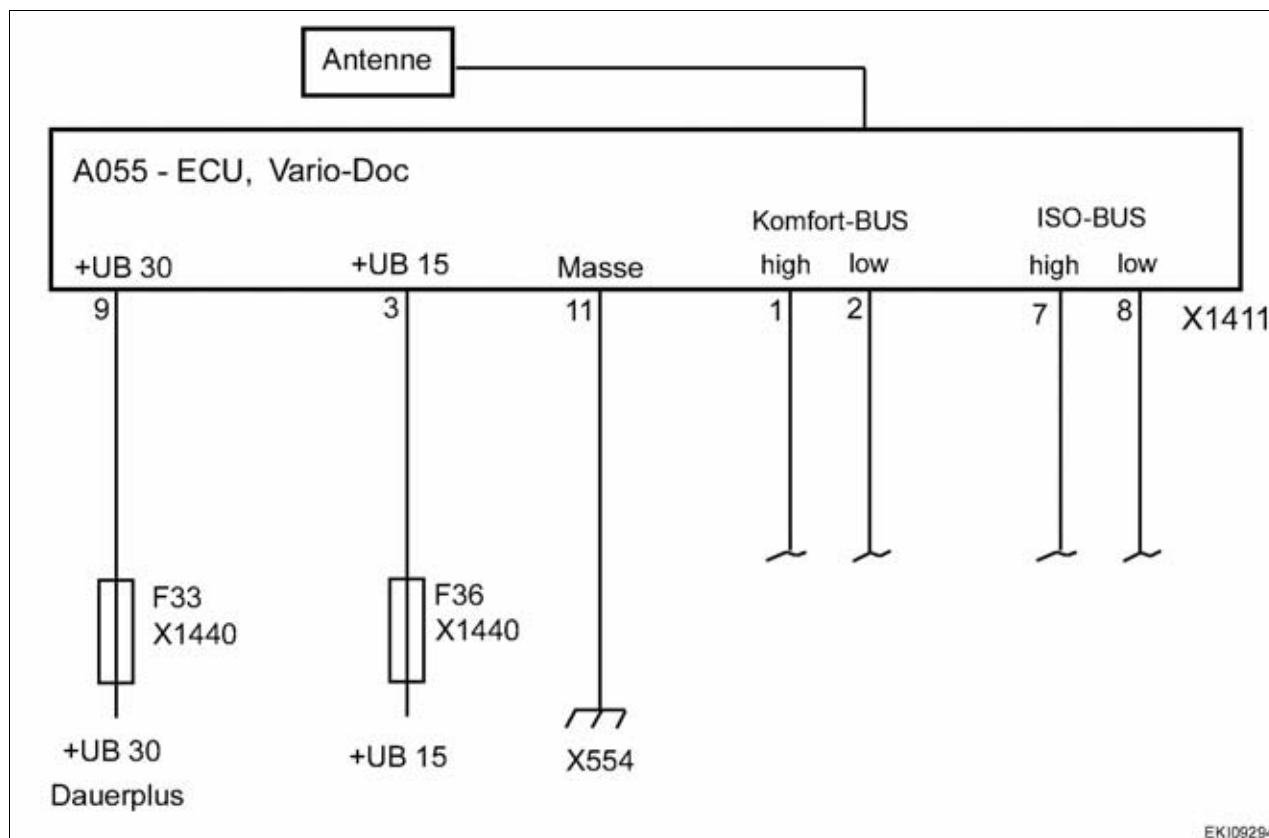


Fig. 115. Circuit diagram: A055 ECU, Vario-Doc

EKI09294
1006092

Pins on the A055 ECU, Vario-Doc

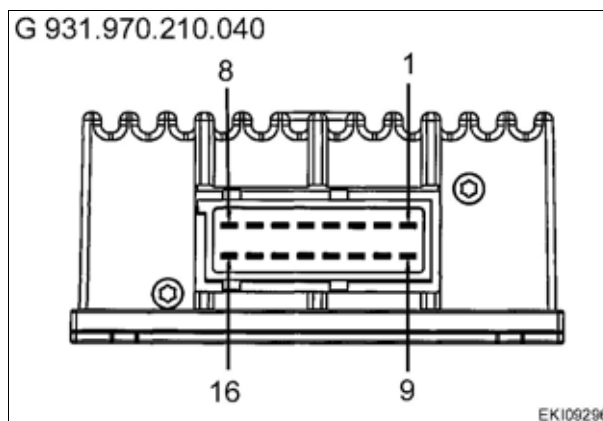


Fig. 116.

EKI09296
1005516

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

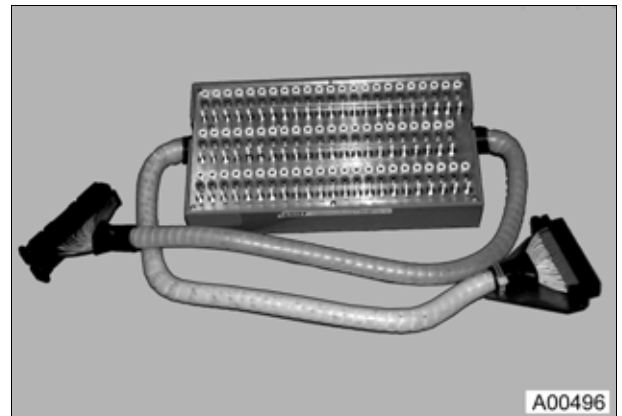


Fig. 118.

I005686

Aerial

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

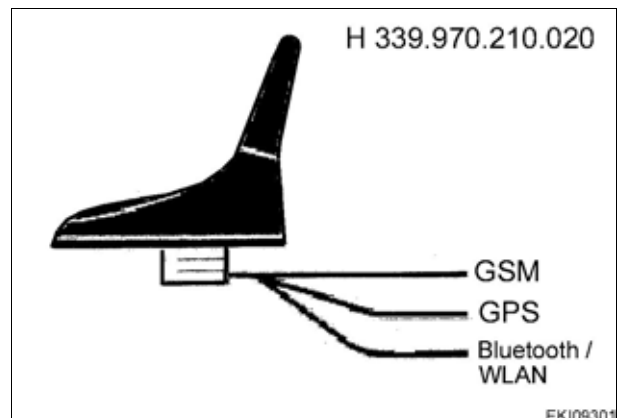


Fig. 119.

I005517

A055-ECU, MoDaSys wiring

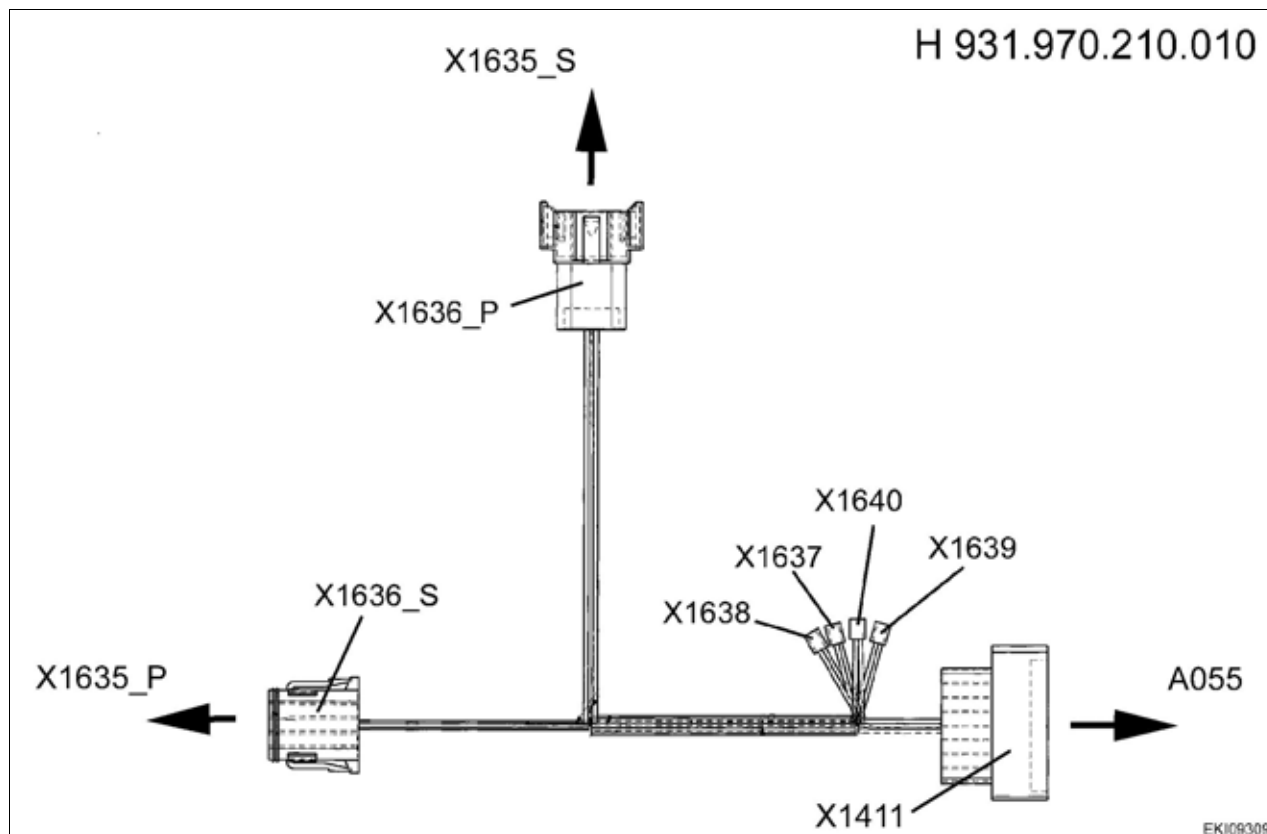


Fig. 120. Connection cable (H 931.970.210.010)

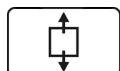
I005547

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).

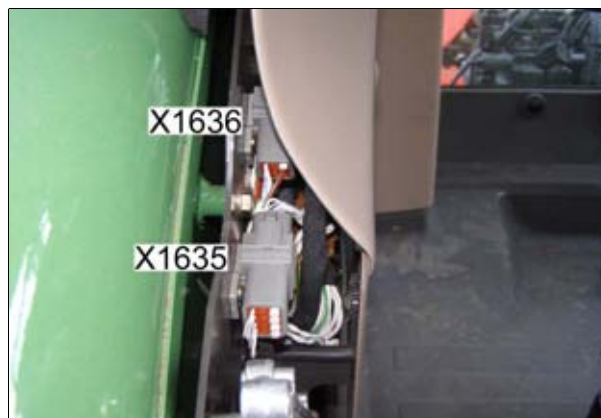


Fig. 121.

I001302

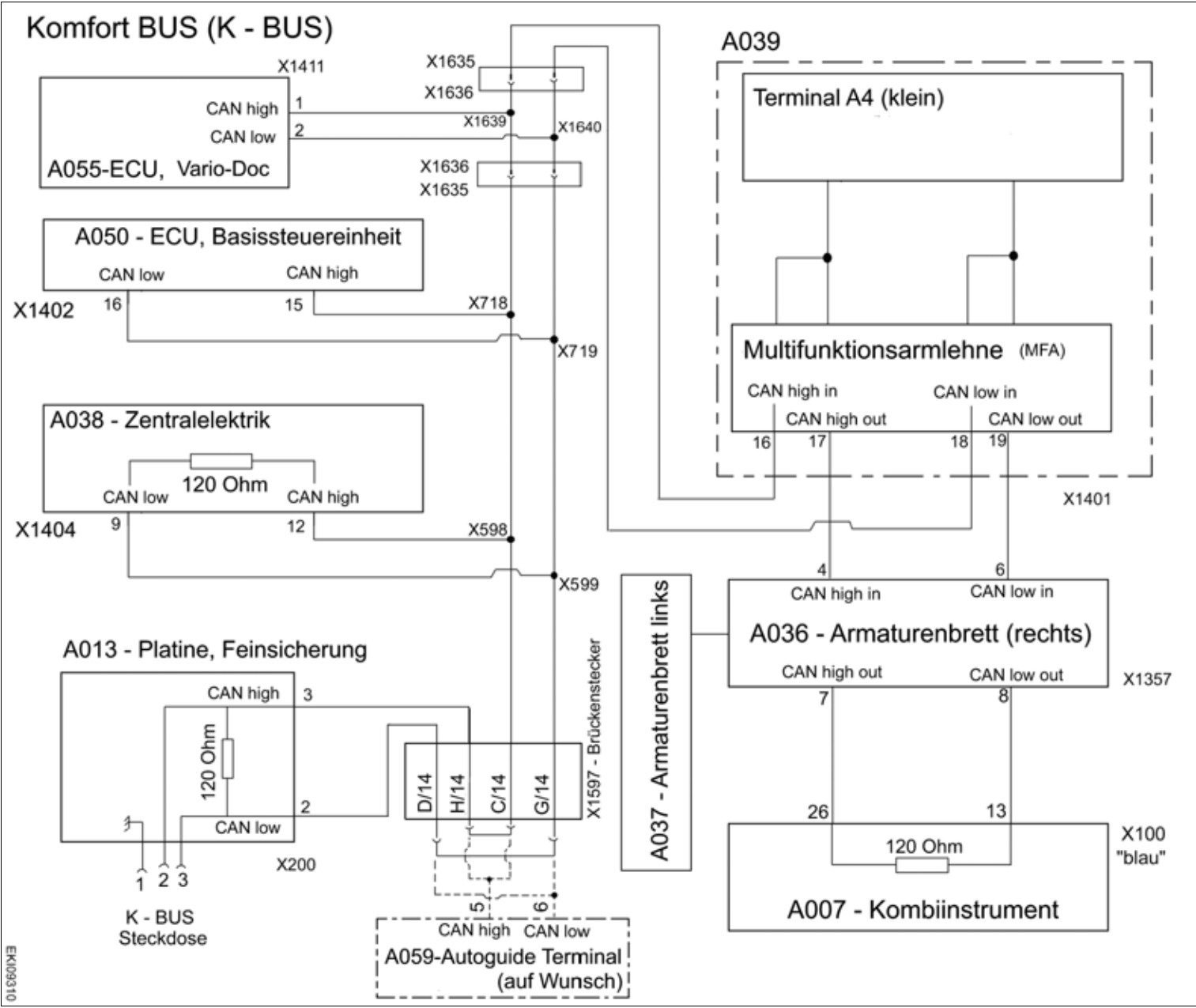


Fig. 122. Control bus (Version A)

EK109310
1006095

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-

T001692
Version 1
21-04-2009

193

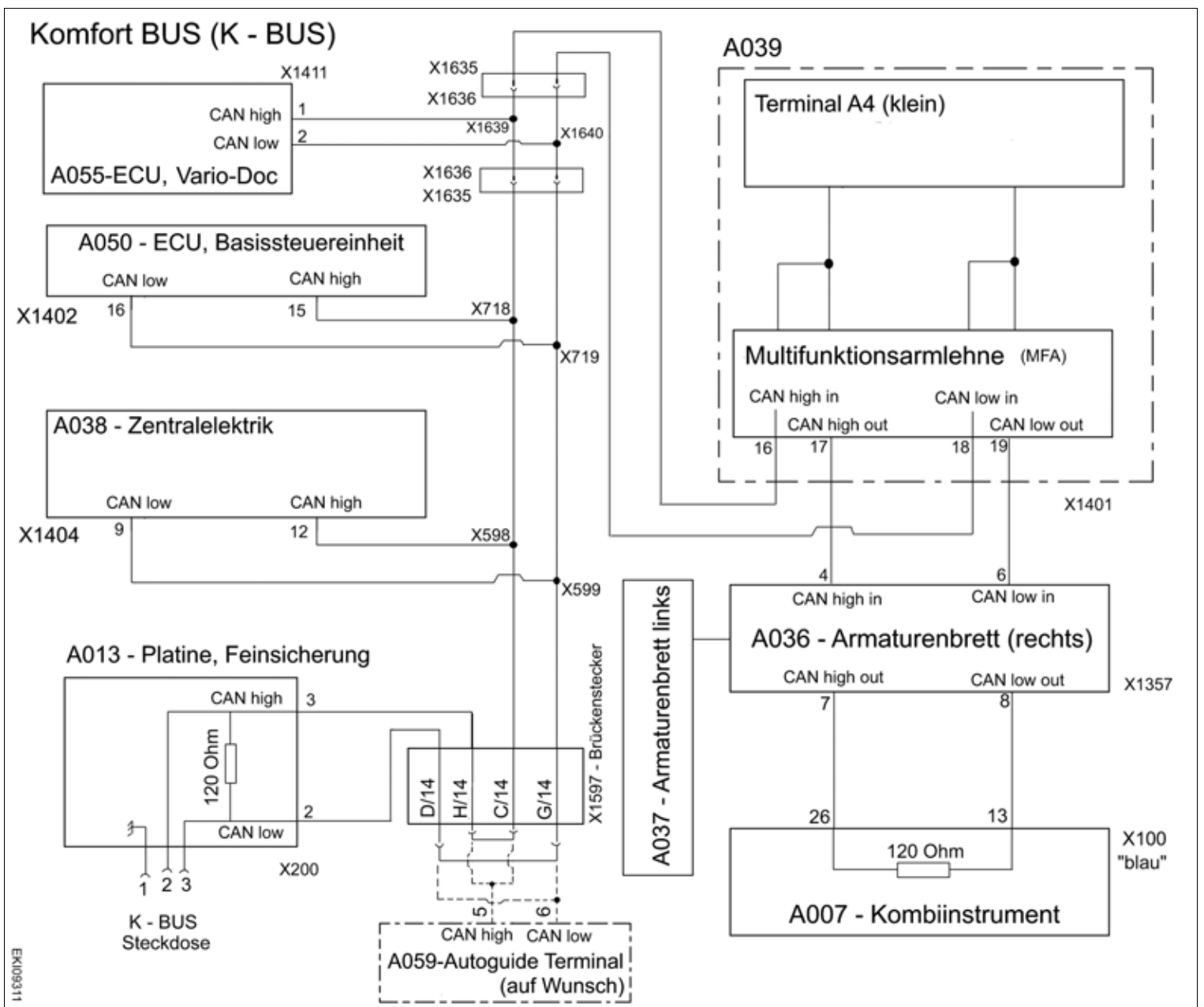


Fig. 123. Control bus (Version B)

EK109311
1006096

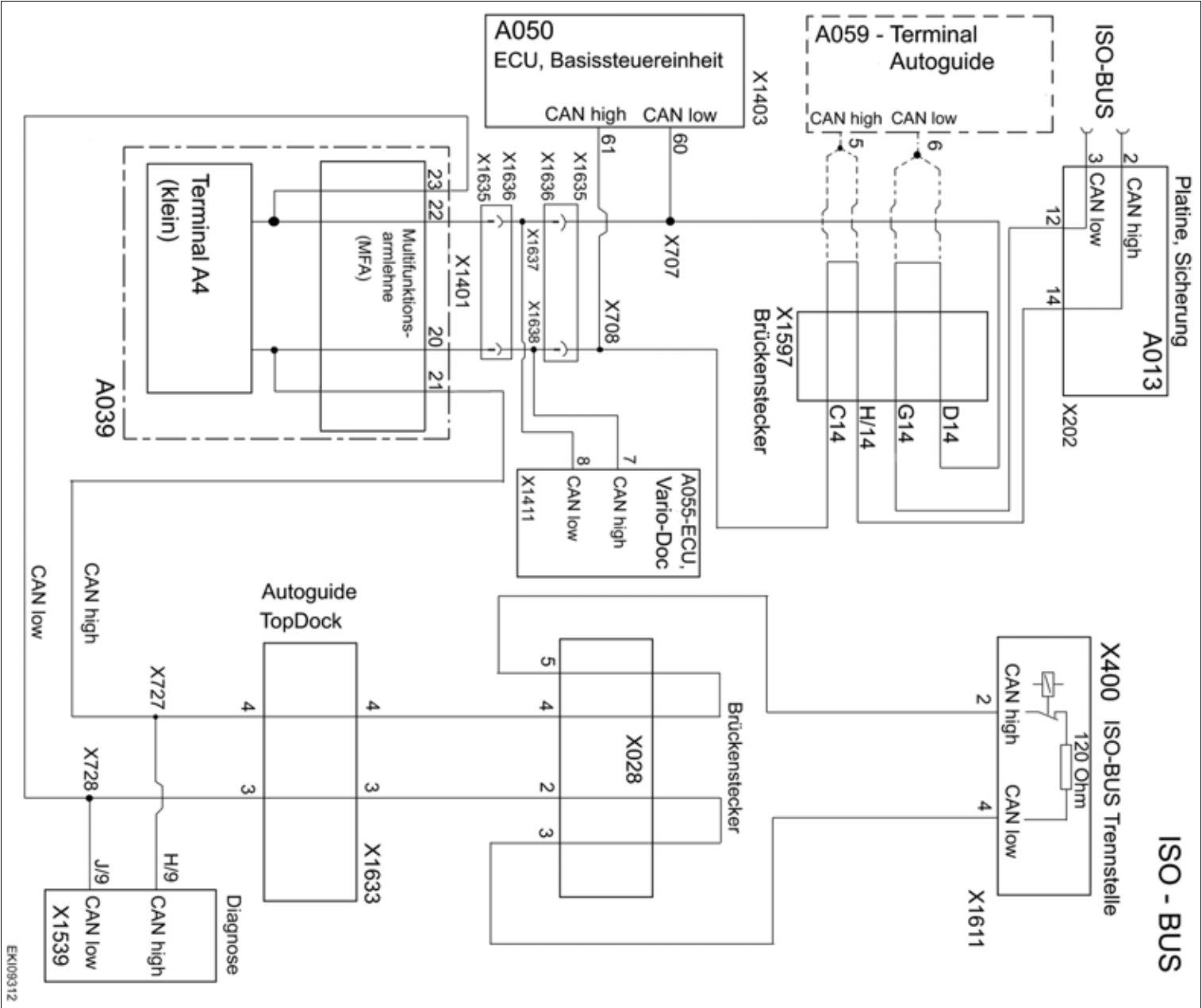


Fig. 124. ISO bus

EKID9312
1006097

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-

T001692
Version 1
21-04-2009

195

42 A058 Autoguide TopDock (receiver unit)

Autoguide TopDockFit



On cab ceiling (in ceiling compartment).

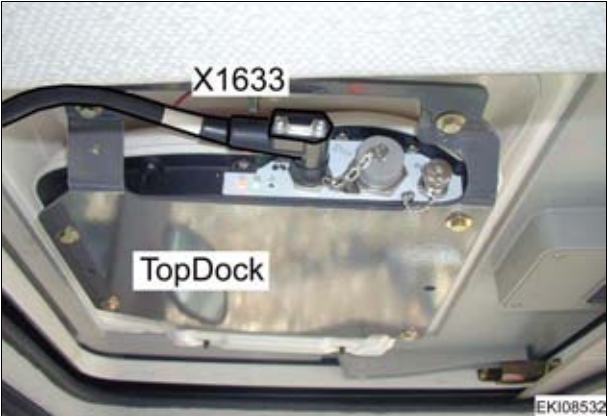


Fig. 125.

X1633 separation point for "TopDock"

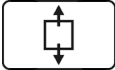
X1633_S separation point (socket)

X1633_P separation point (pin, side view)

TopDock – connecting cable to TopDock (receiver unit)



Top right in cab ceiling.



Remove right B051 loudspeaker.

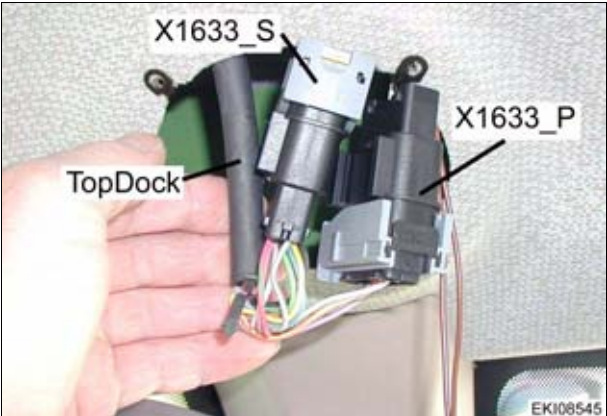


Fig. 126.

Diagram: Autoguide system (FENDT 900 Vario COM III)

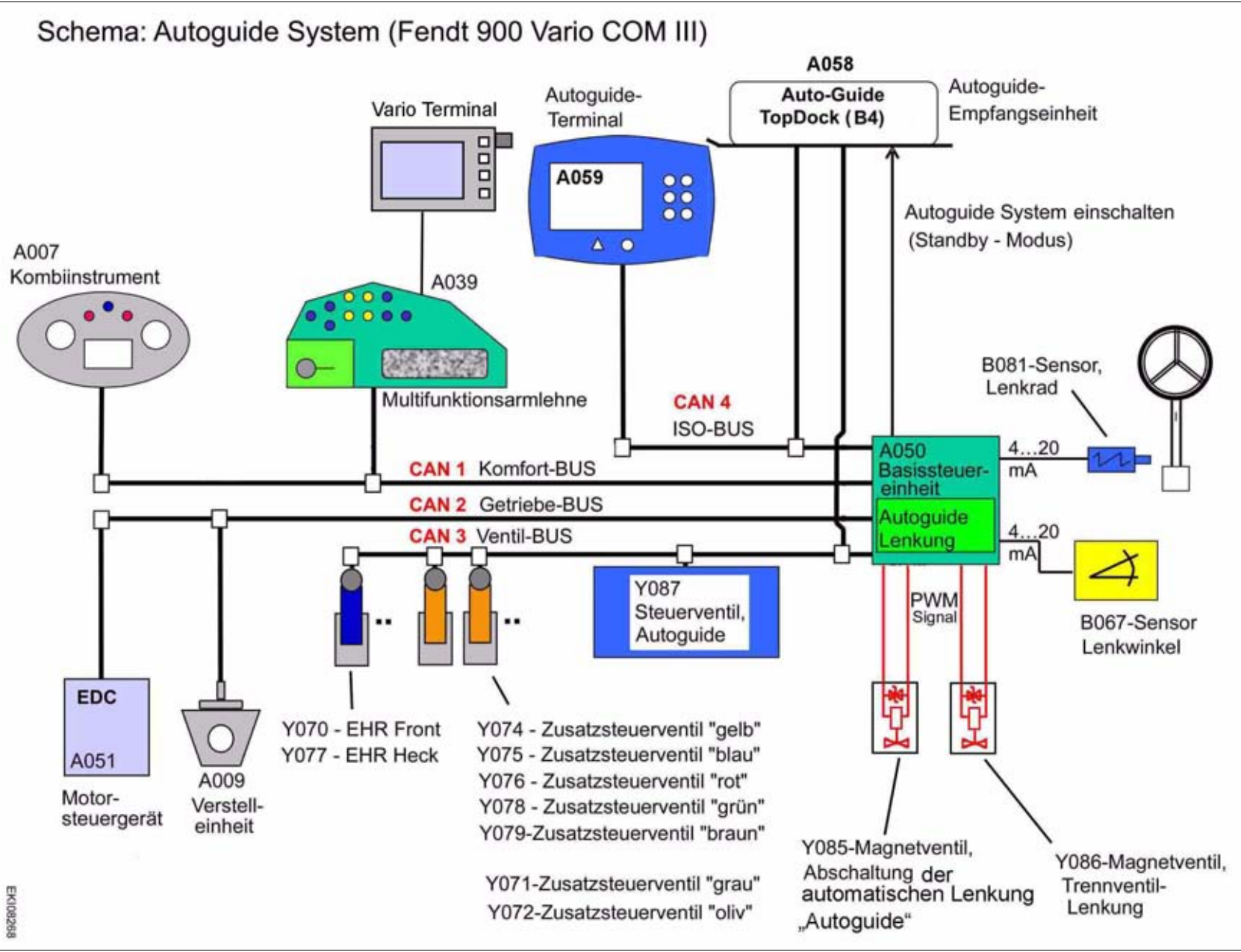


Fig. 127.

EK108268

1002162

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-

T000781
Version 2
06-05-2008

197

Circuit diagram: A058 Auto-Guide TopDock

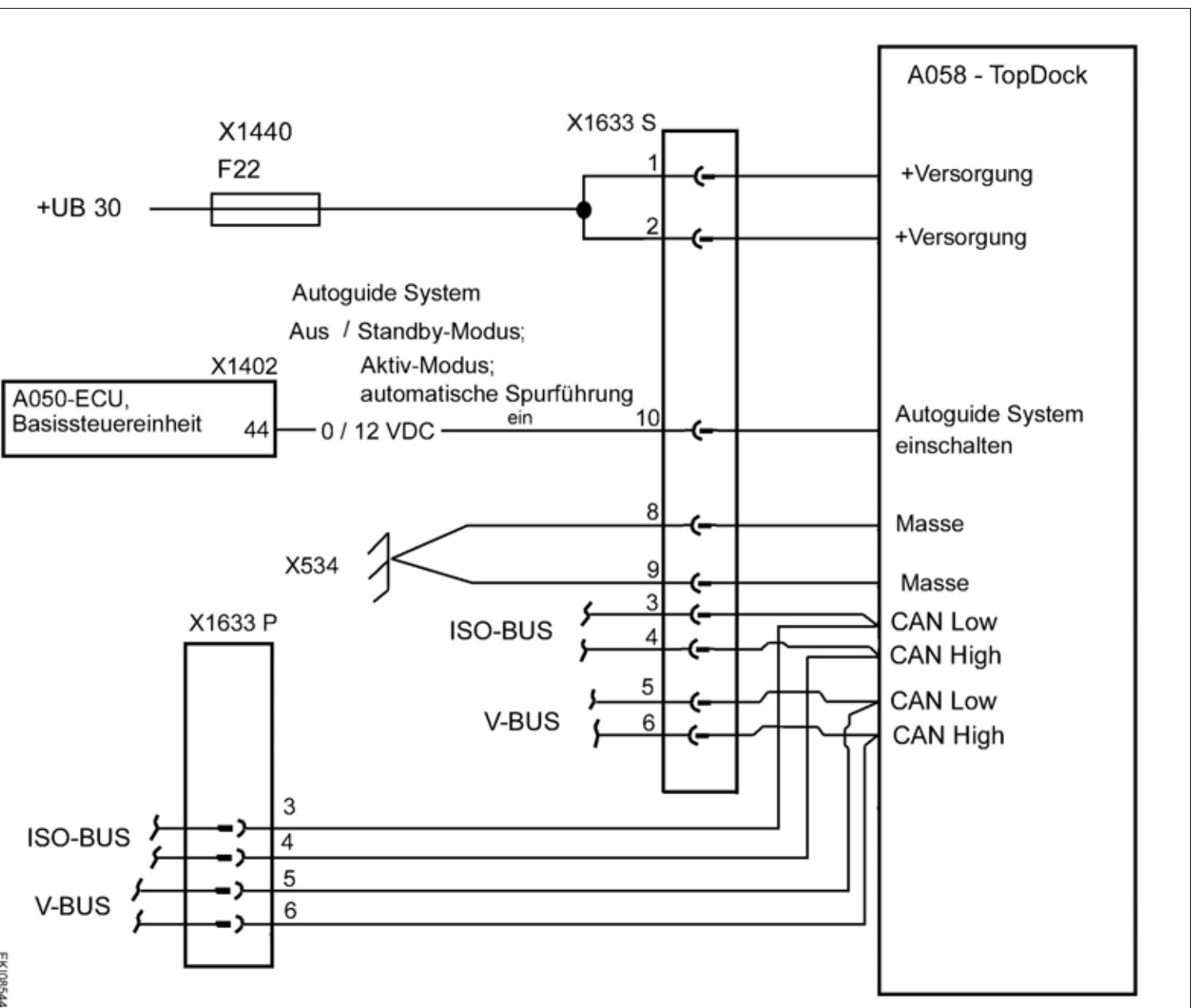


Fig. 128. Wiring of the A058 Auto-Guide TopDock

EK108544
1004836

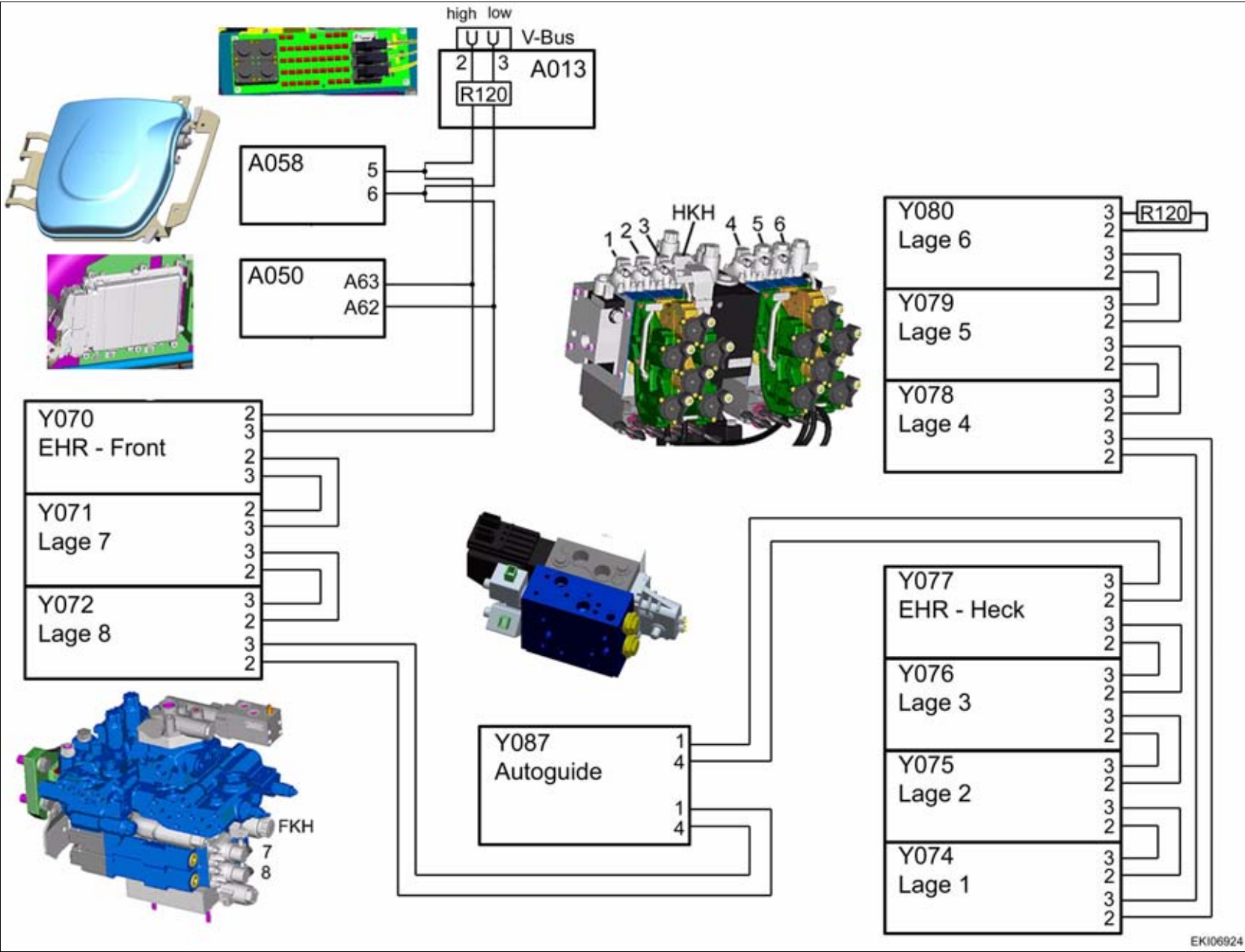


Fig. 129. Diagram: Valve BUS (V-BUS)

1004837

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-

T000781
Version 2
06-05-2008

199

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. 1001030

Layout of Auto-Guide TopDock (GPS receiver unit, gyro compass "DMU"; radio module (with base station only))
Disconnect and remove A058 TopDock.

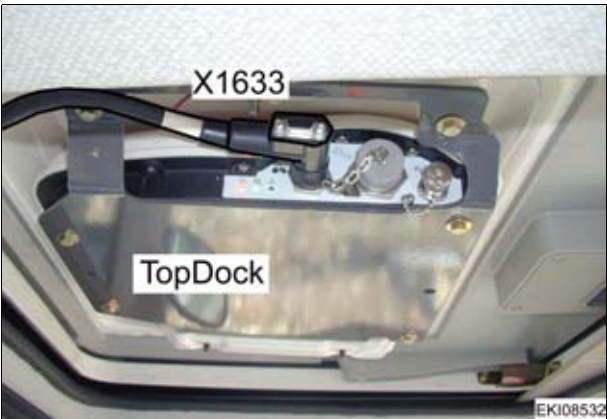


Fig. 131. 1002345

Remove retaining plate.



Fig. 132. 1002352

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



Fig. 133. 1002353

FENDT**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)

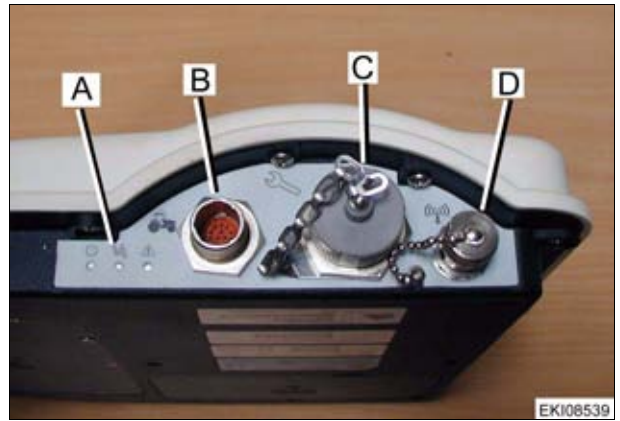


Fig. 134.

EKI08539
I002354

Remove cover.

Remove gyro-compass "DMU".

Fig. 135.

EKI08540
I002355

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

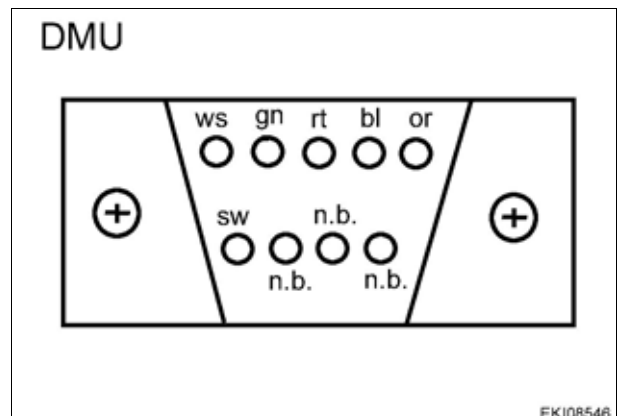


Fig. 136.

EKI08546
I002359

Remove cover.

Radio module (2-way radio receiver)

(only fitted when a base station is used)



Fig. 137.

EKI08541
I002356

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-

T000781
Version 2
06-05-2008

201

Remove protective cover.
GPS aerial (satellite receiver)



Fig. 138.

1002357

Rating plates



Fig. 139.

1002358

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.

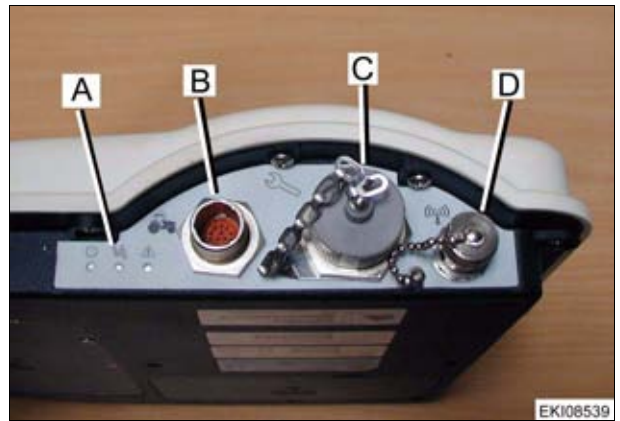


Fig. 140.

EKI08539
I002354

The standby time can be set on the A059 Autoguide terminal.

Scroll with the "arrow buttons".



Fig. 141.

EKI08612
I002414

The next screen is displayed.

Continue to the diagnostics menu with the "spanner" button.



Fig. 142.

EKI08613
I002415

The first diagnostics screen is displayed.

Continue with the "arrow button".



Fig. 143.

EKI08614
I002416

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



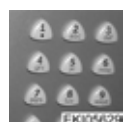
Fig. 144.

1002417

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.

1002418

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



Fig. 146.

1002422

43 A059 Autoguide terminal**A059 Autoguide terminal**

Fig. 147.

EKI05647
I001366

Connecting cable for A059 Autoguide terminal.

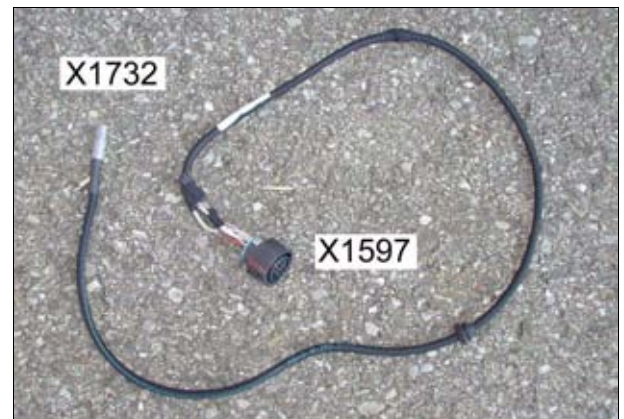


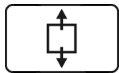
Fig. 148.

I002346

Connect the X1597 separation to tractor wiring harness



On right mudguard



Remove panel



Fig. 149.

EKI08534
I002347

Connect the X1732 separation point to A059 Autoguide terminal.



Fig. 150.

EKI08533
I002348

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-

T000780
Version 1
05-06-2007

205



Circuit diagram of A059 Autoguide terminal

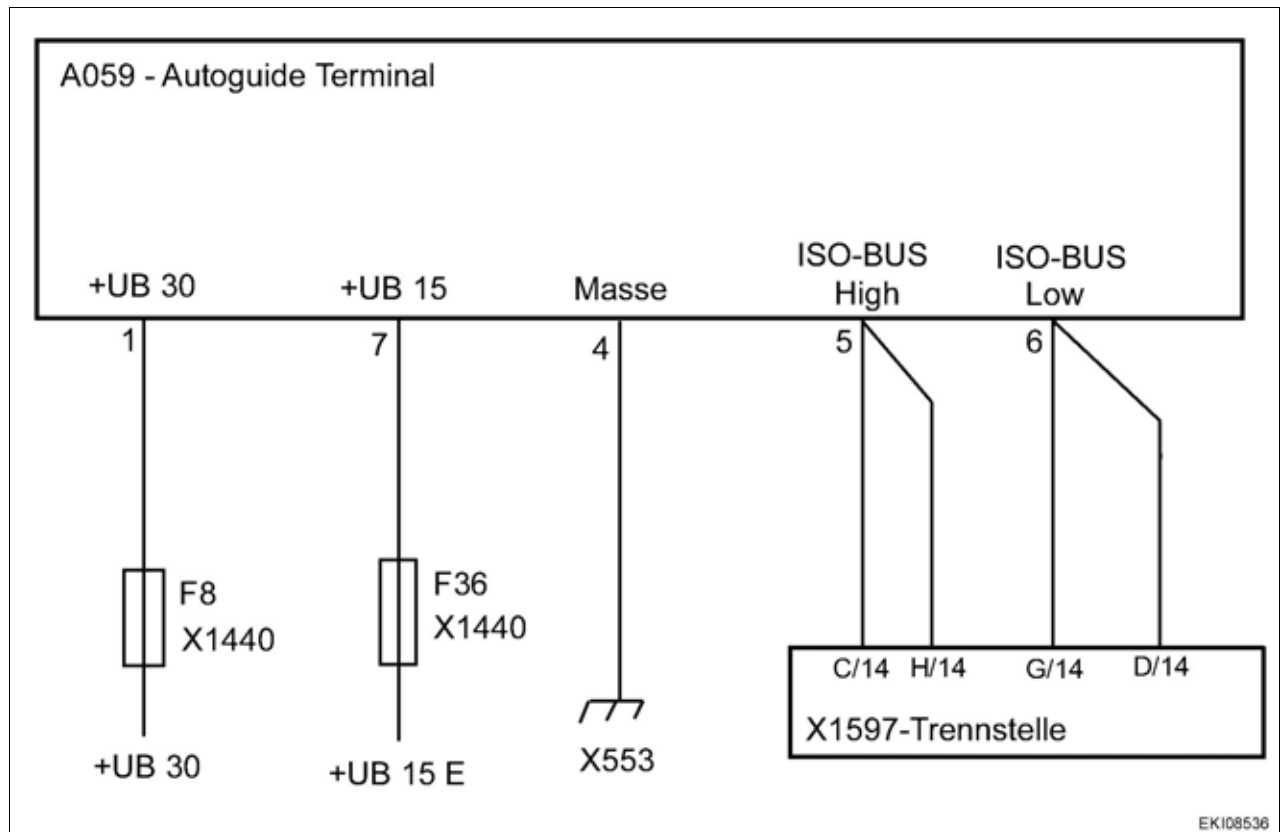


Fig. 152.

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.

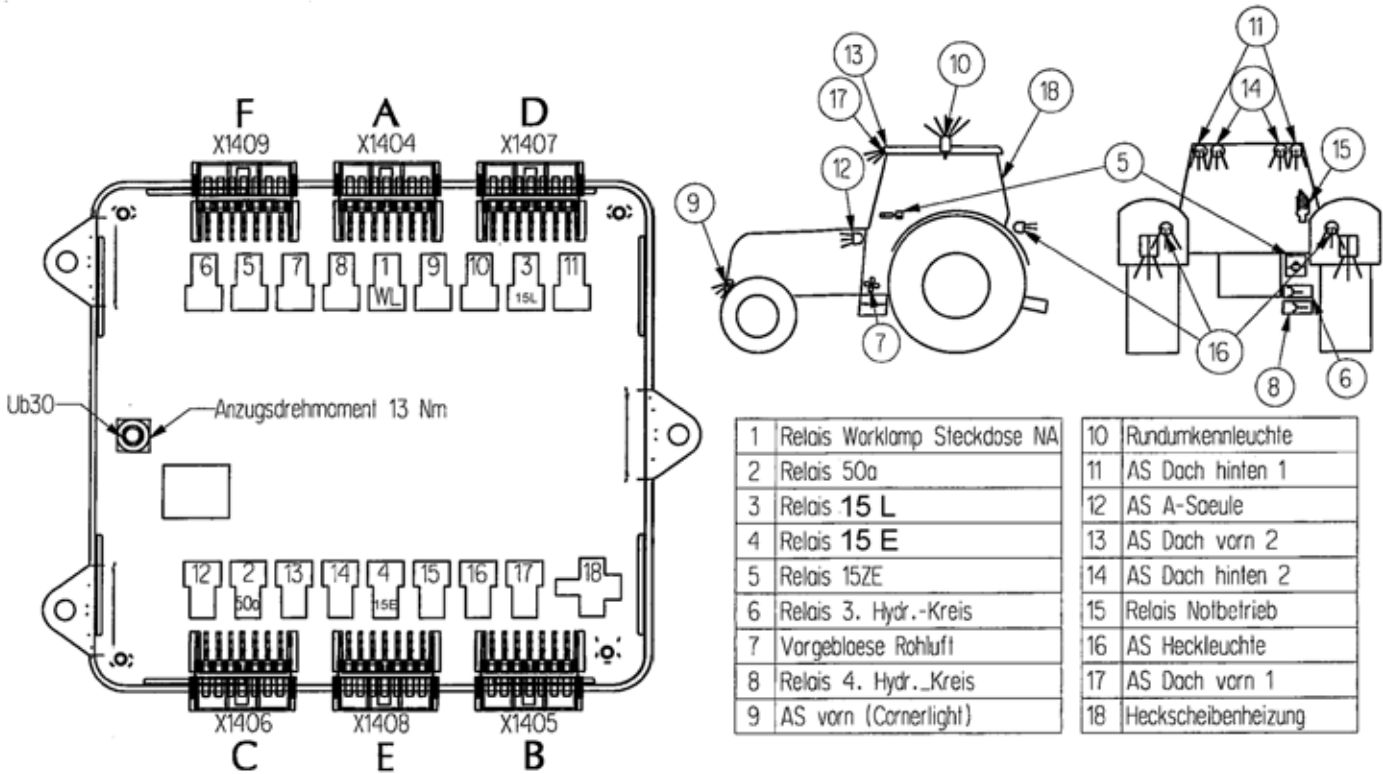


Fig. 154.

I001366

A038 - ECU, Zentralelektrik

931.901.020.120



EK109085

Fig. 155.

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

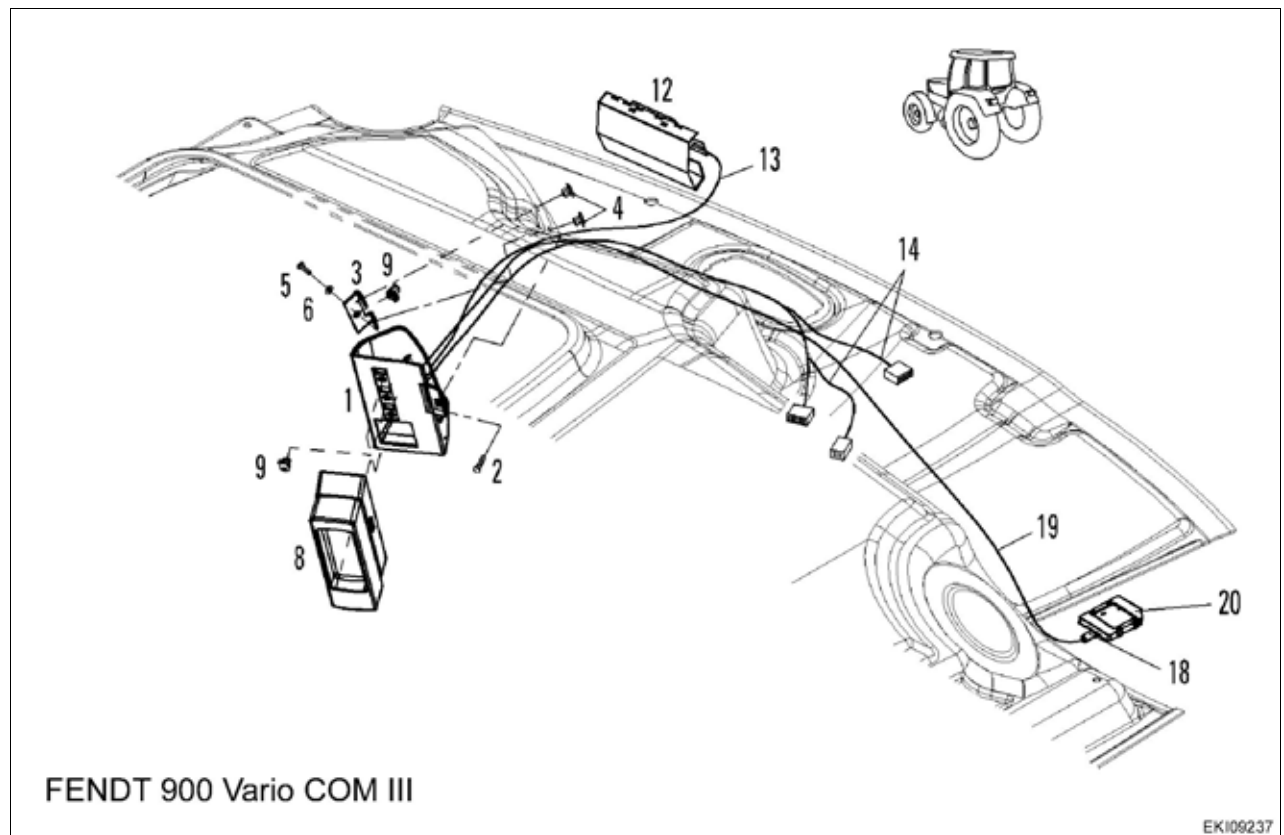
Hotline: +49 (0) 9103-5000-380



Fig. 156.

EK109224
1004909**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)



EK109237

Fig. 157.

1005110

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

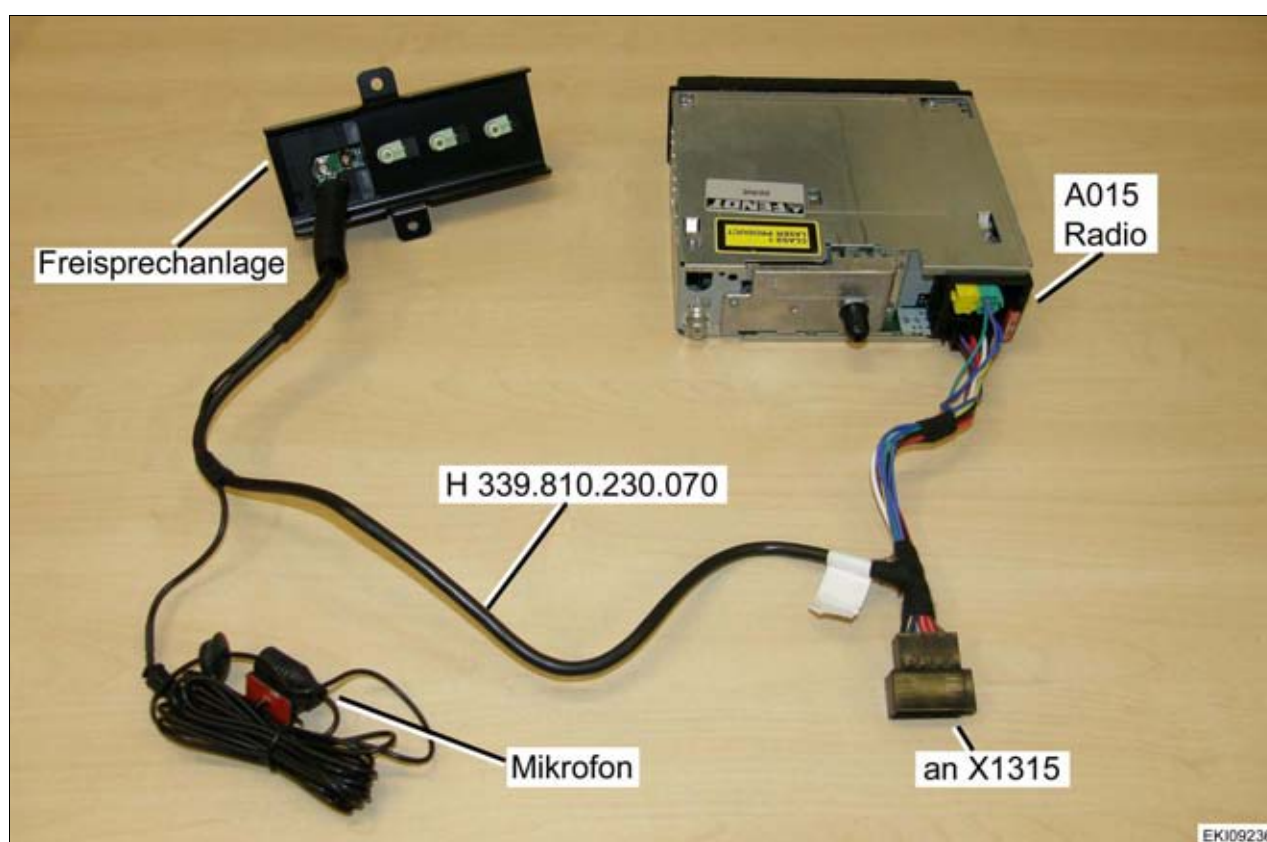


Fig. 158. Wiring set to link A015 radio and A060 handsfree system

1005104

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	

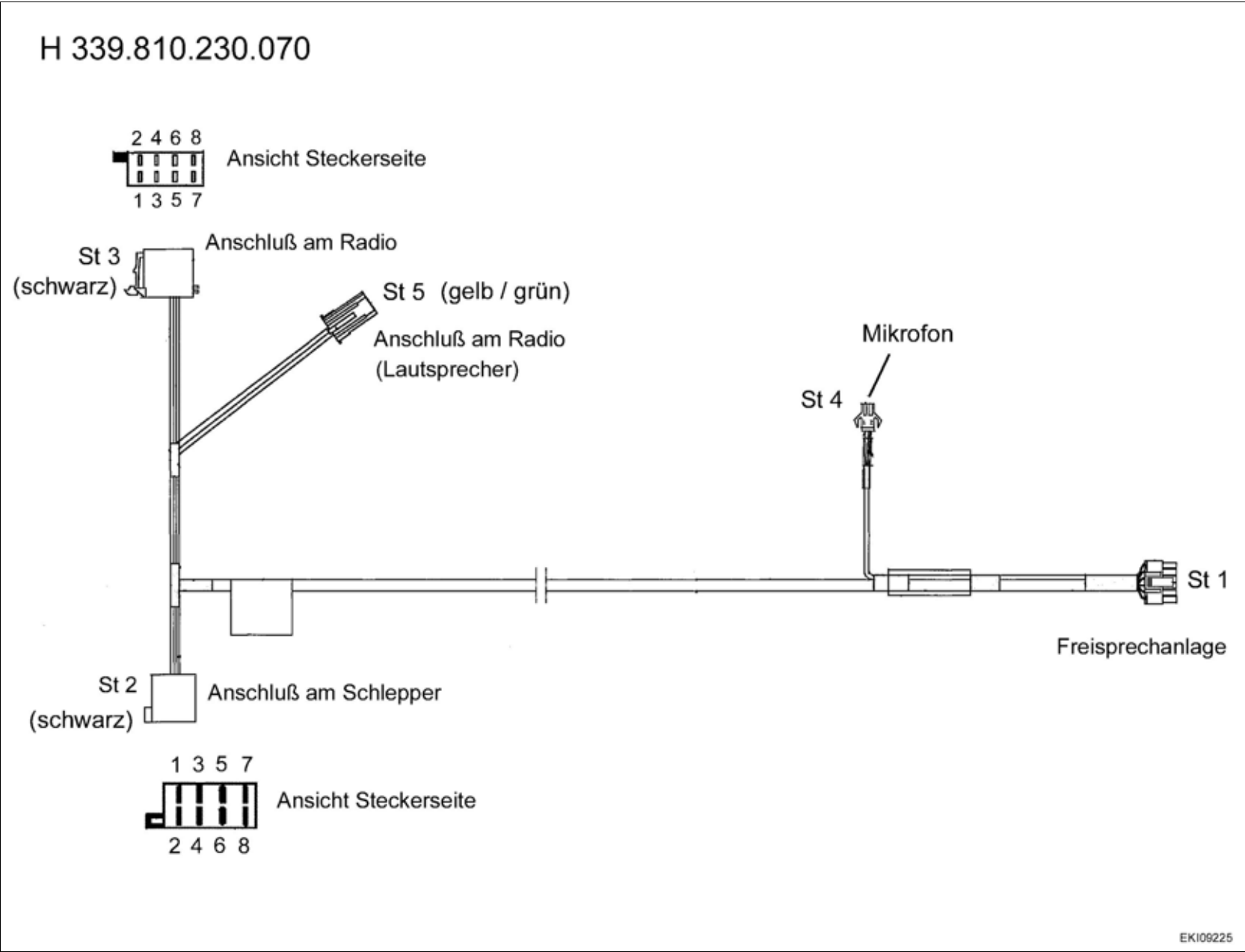


Fig. 159. Adapter cable H 339.810.230.070/H 931.812.230.070

1005105

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-

T001533
Version 1
21-04-2009

211

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.

1004912

Cable routing for handsfree system



Fig. 161.

1004910

Connect adapter cable H 339.810.230.070 to the hands-free 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.

1004911

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)

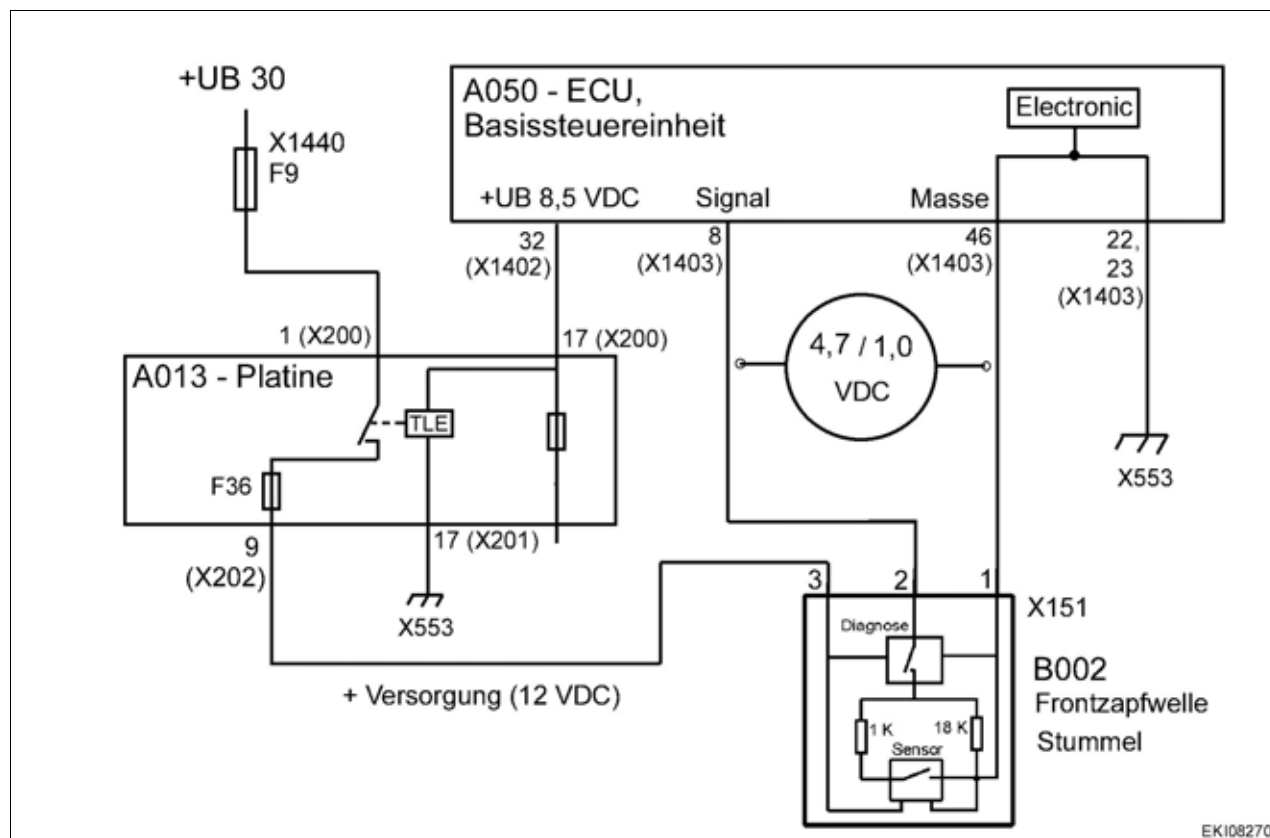


Fig. 163.

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

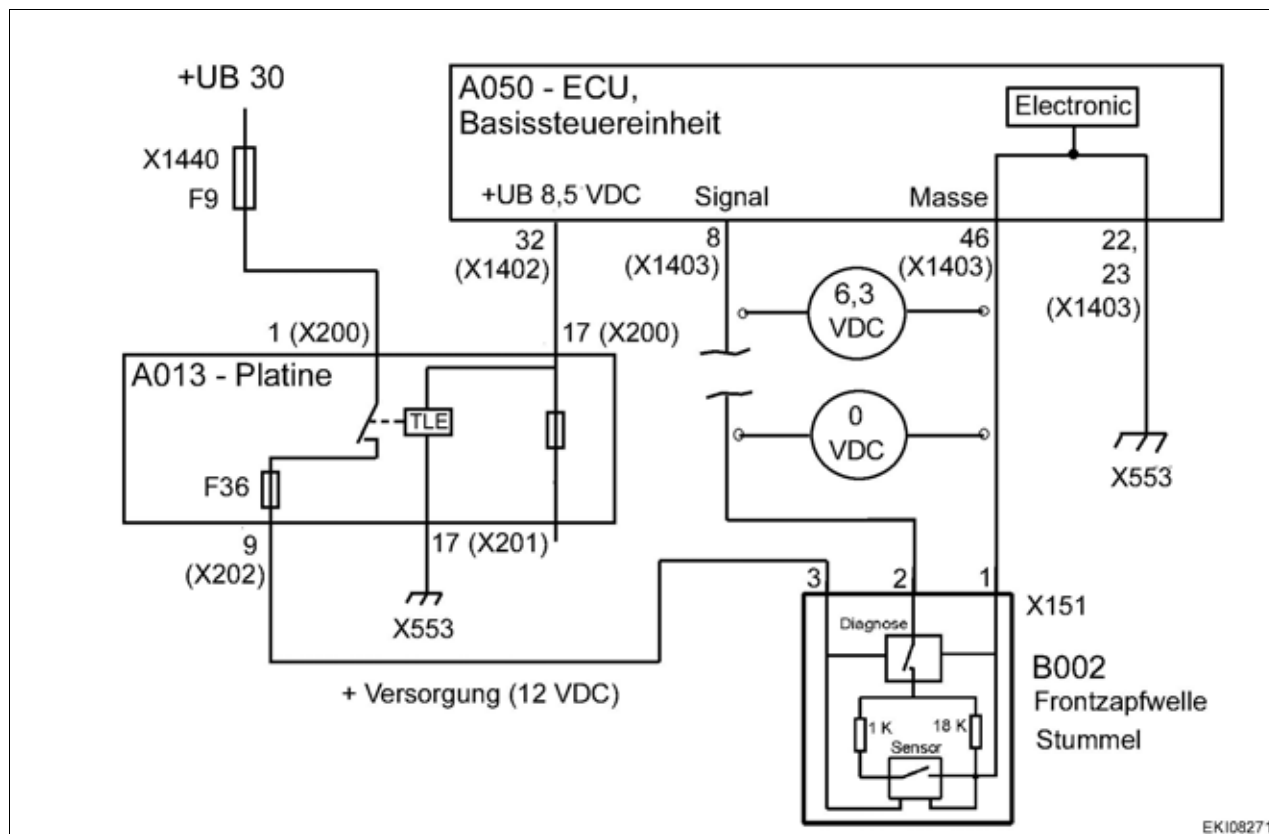


Fig. 165.

EKI08271

I002977

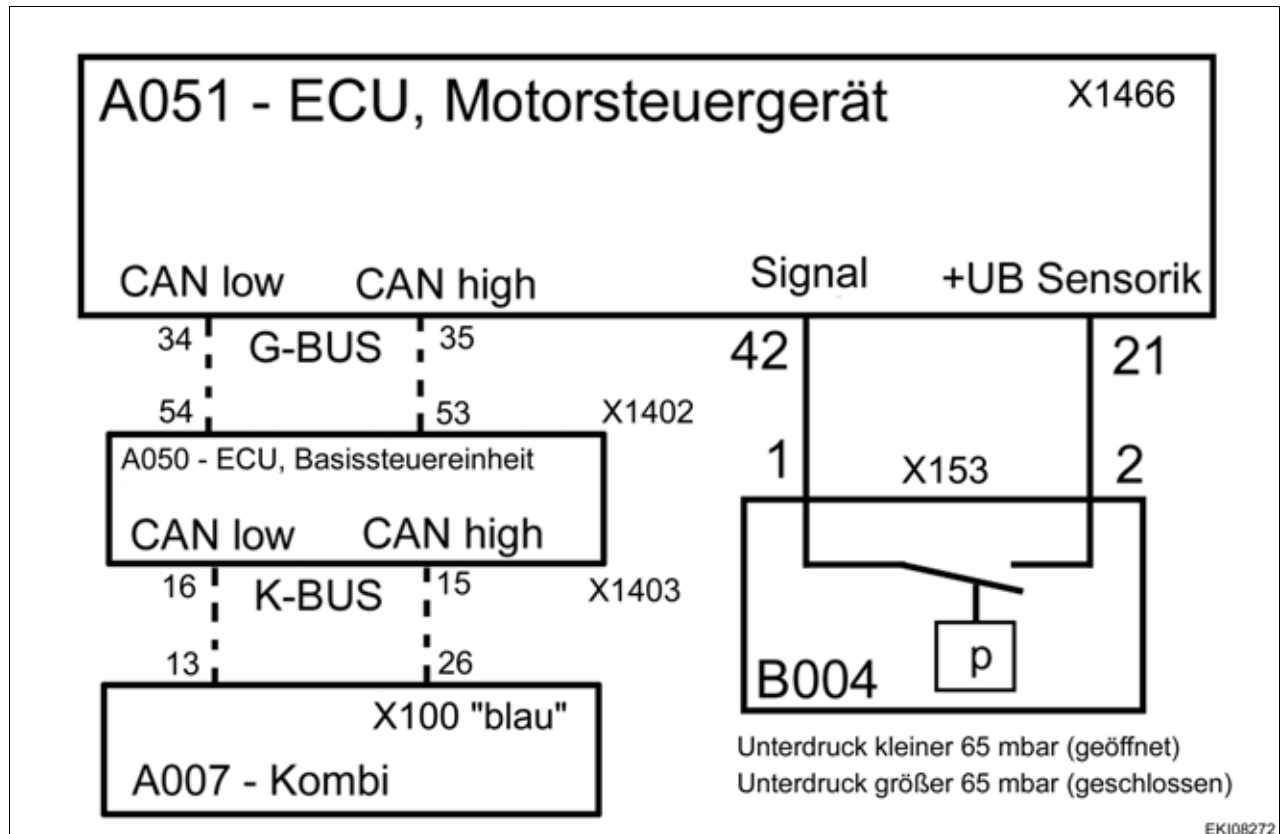
46 B004 vacuum switch (air filter)

Fig. 166.

EKI08272
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

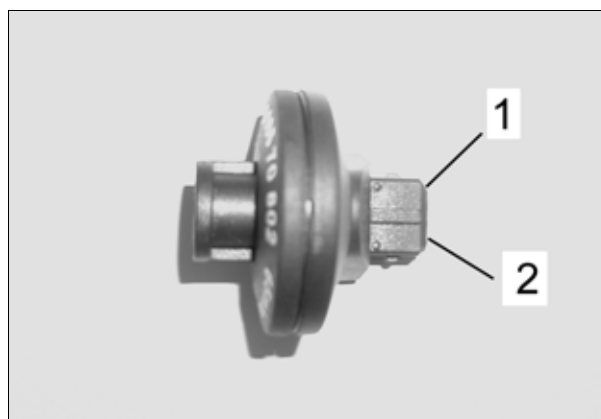


Fig. 167.

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

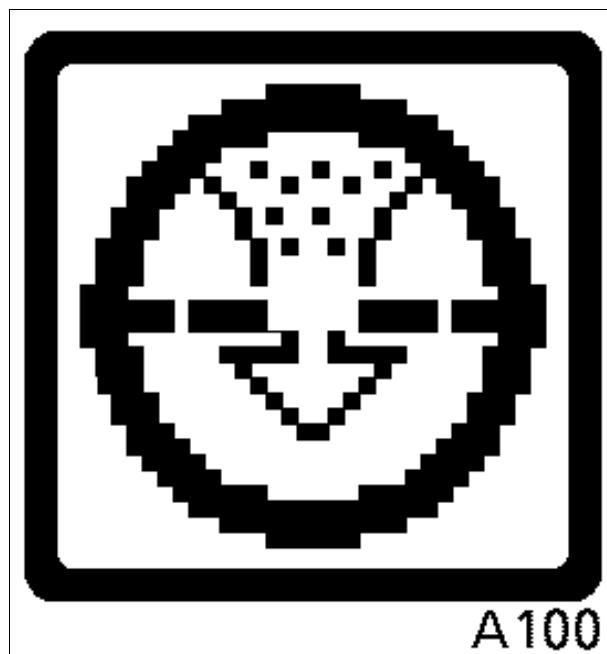


Fig. 168.

I000395

47 B008 sensor, high pressure 1

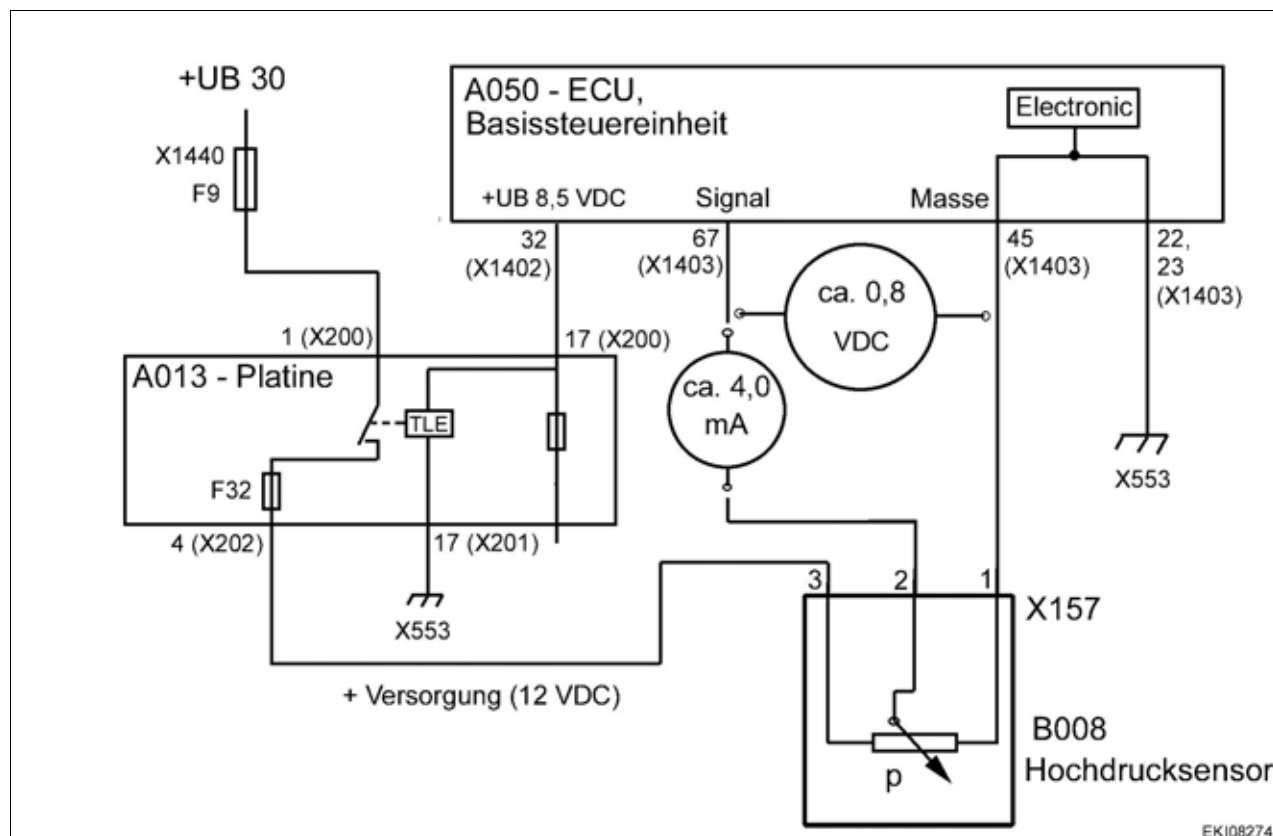


Fig. 169.

EK108274
 1001928

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 trans- mission 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](#)

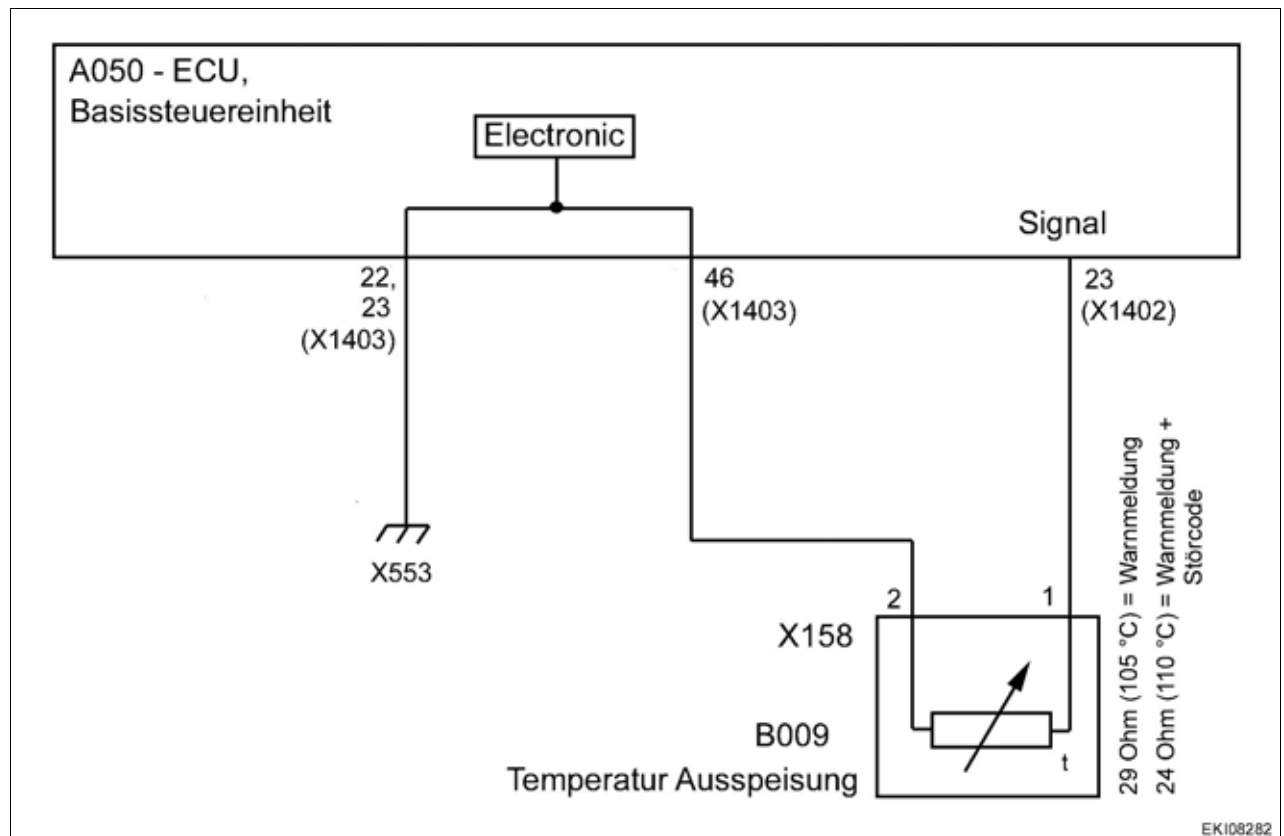
48 B009 sensor, discharge temperature

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

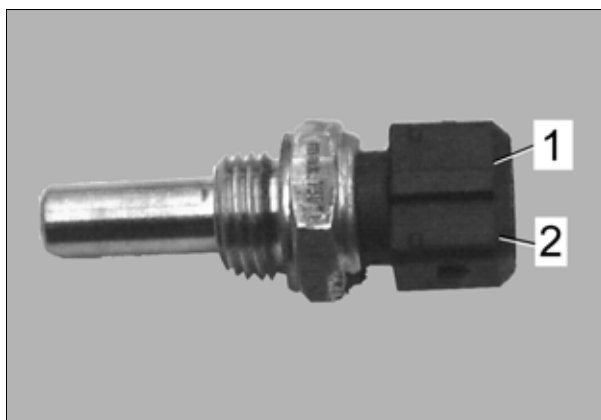


Fig. 172.

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 04.153

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.

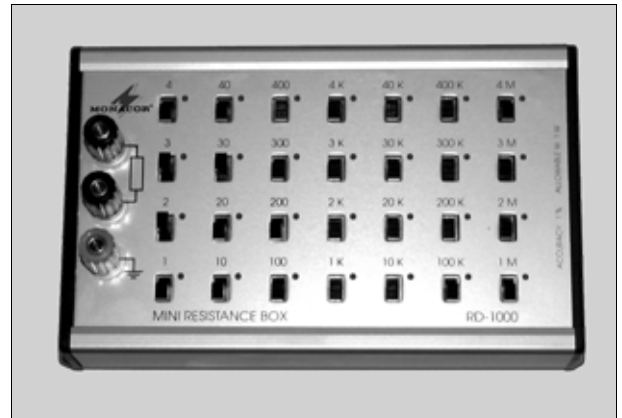


Fig. 174.

1000639

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

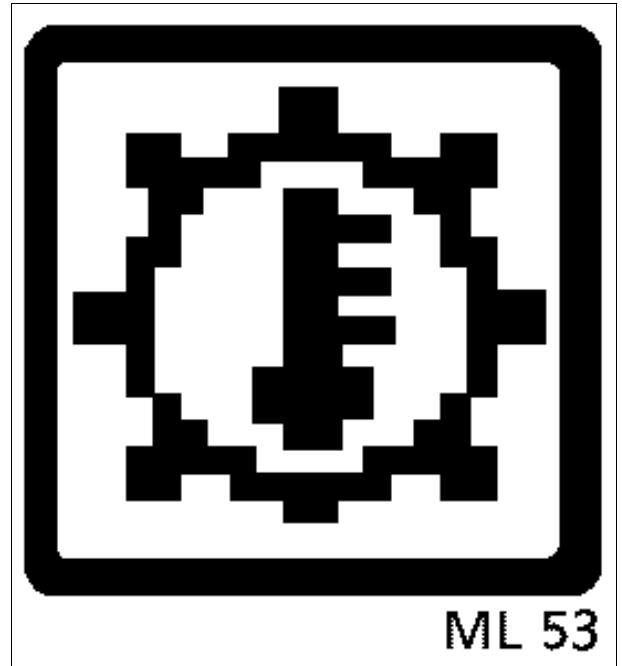


Fig. 175.

1000394

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

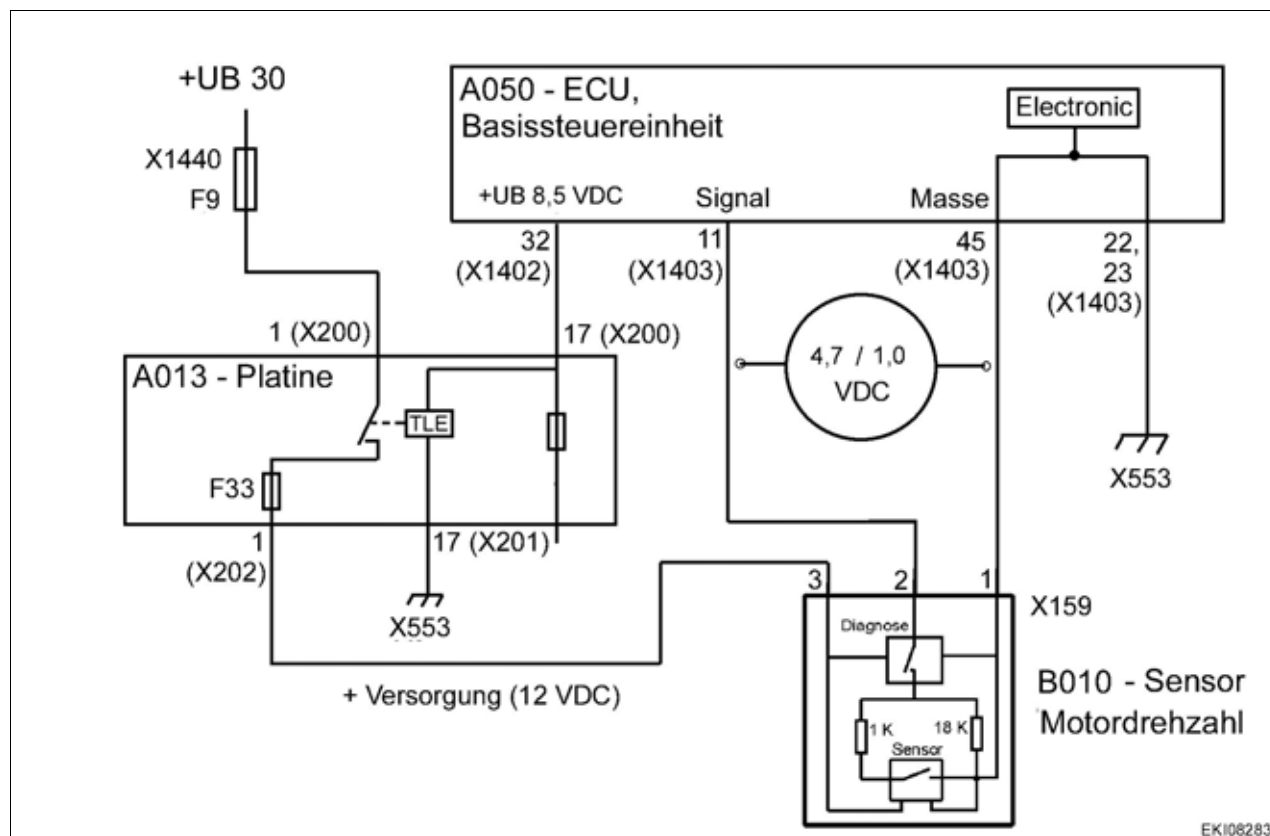


Fig. 176.

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

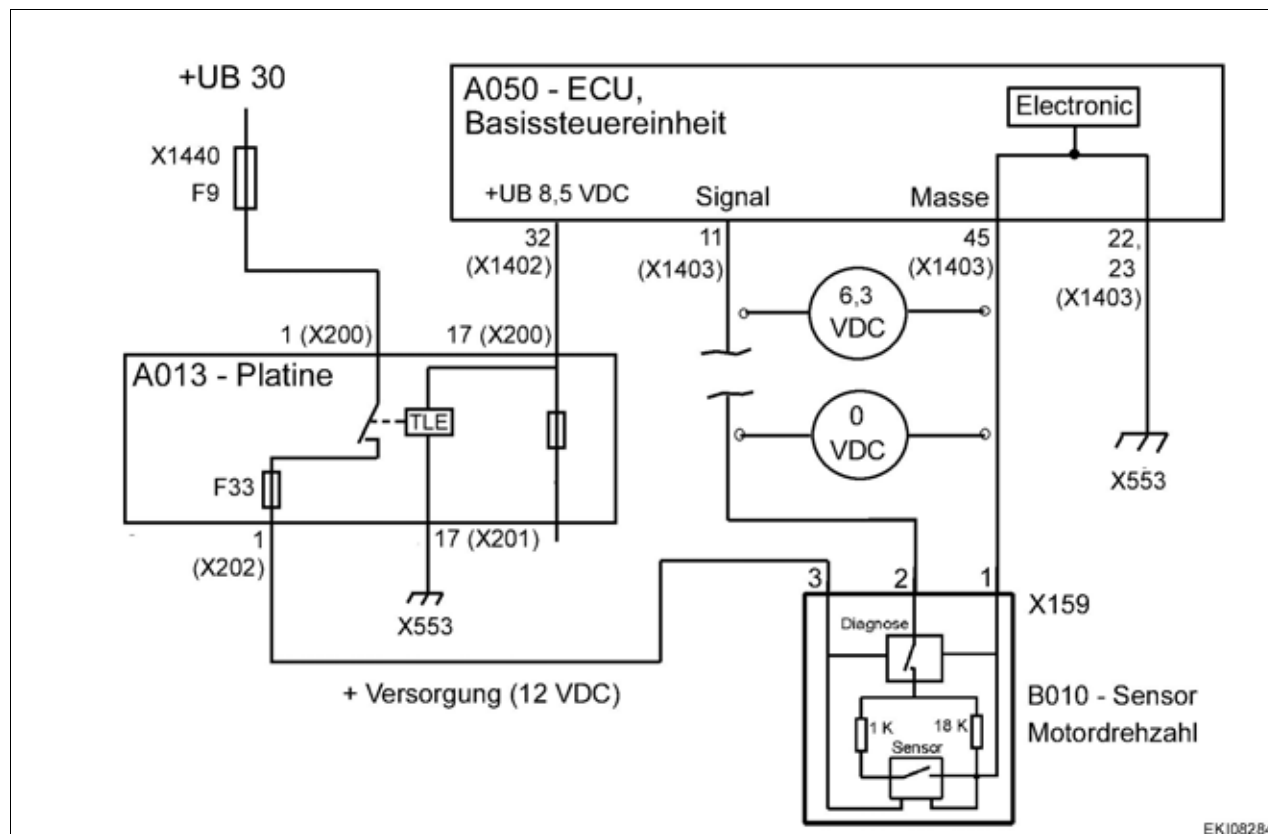


Fig. 178.

EKID8284

1001935

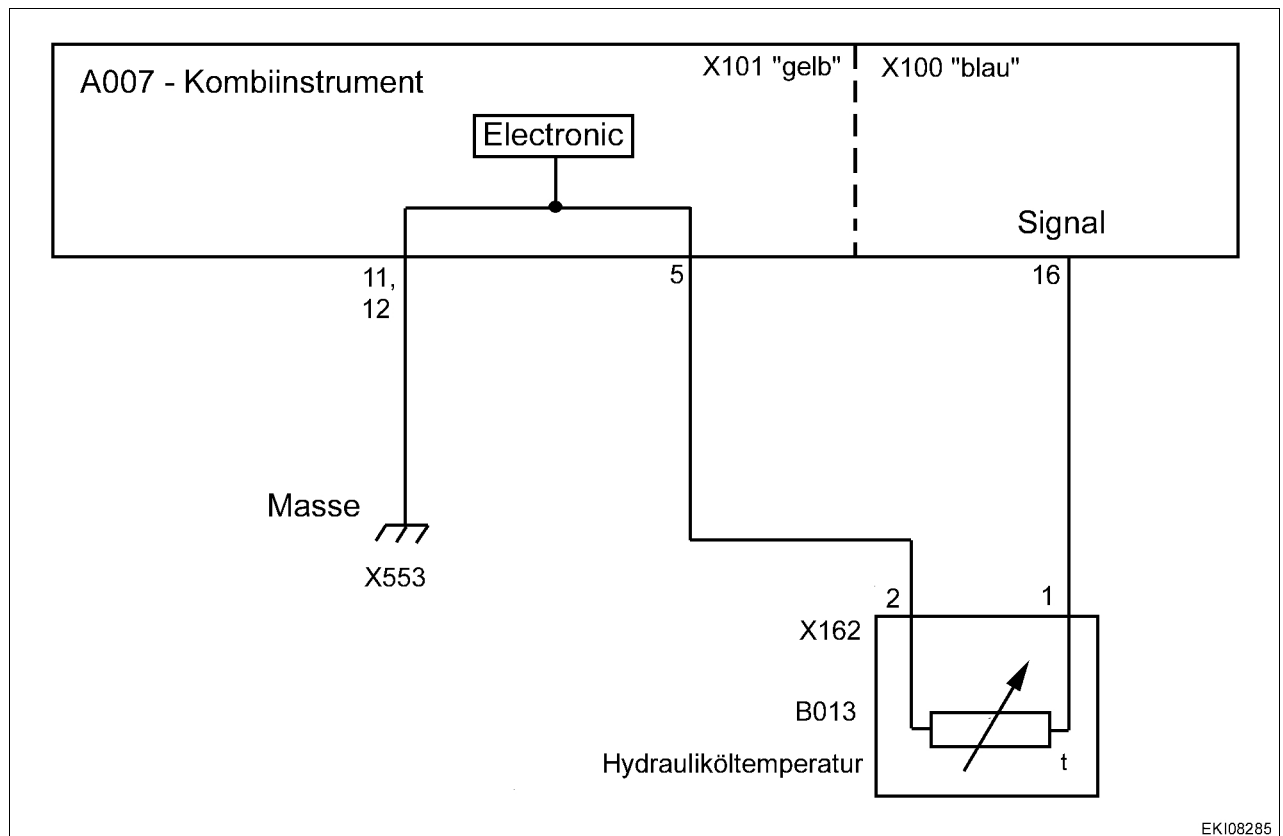
50 B013 hydraulic oil temperature sensor

Fig. 179.

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.

1001061

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.

1000730

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

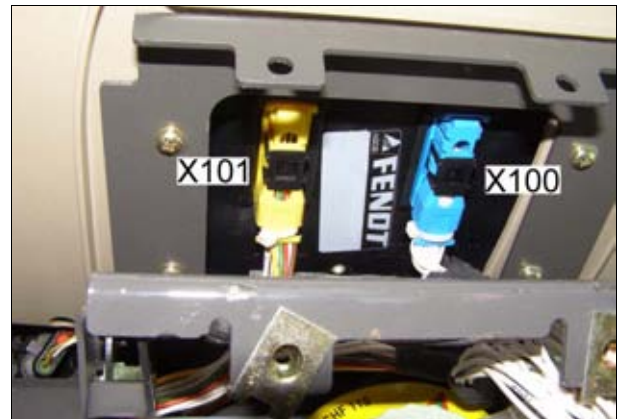


Fig. 182.

1001226

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.

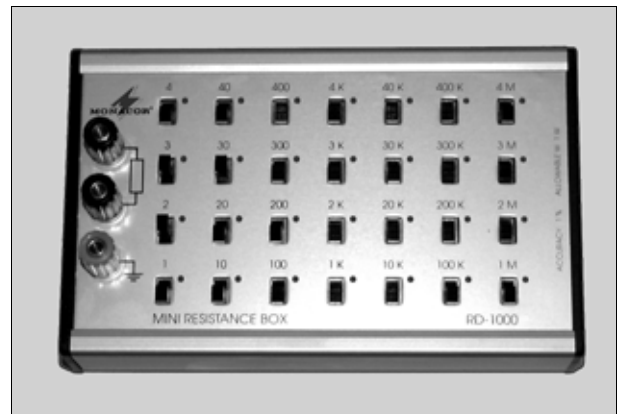
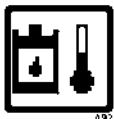


Fig. 183.

1000639



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

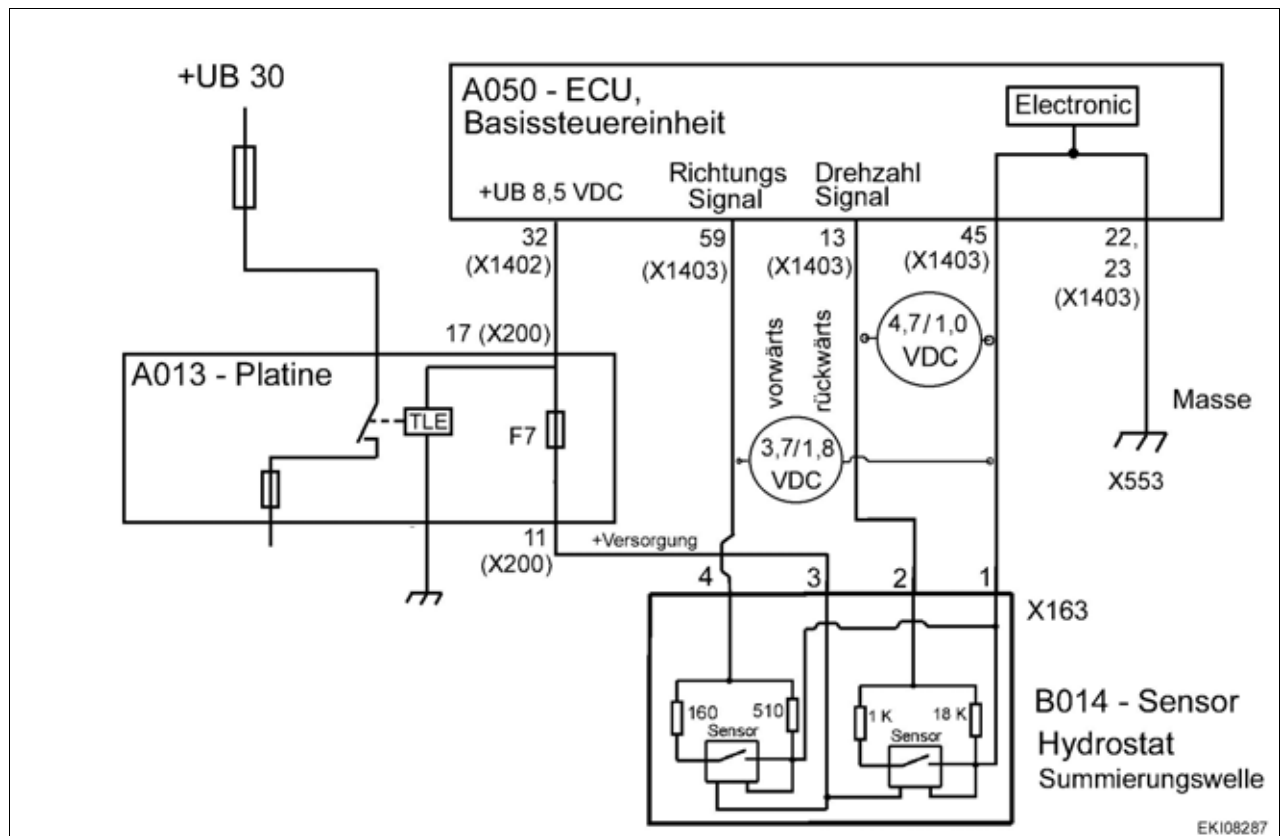
51 B014 sensor, hydrostatic collecting shaft

Fig. 184.

EKI08287

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	3	8.5 VDC		Microfuse (no. S7) in A013 PCB or in wiring set
Earth	1			
Signal, speed	2	4.7/1.0 VDC	Tractor stationary (depending on ratchet wheel setting)	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
Earth	1	2.8 VDC	Tractor moving	
Signal, rotational direction	4	3.7 VDC	Tractor advancing	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
Earth	1	1.8 VDC	Tractor reversing	

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

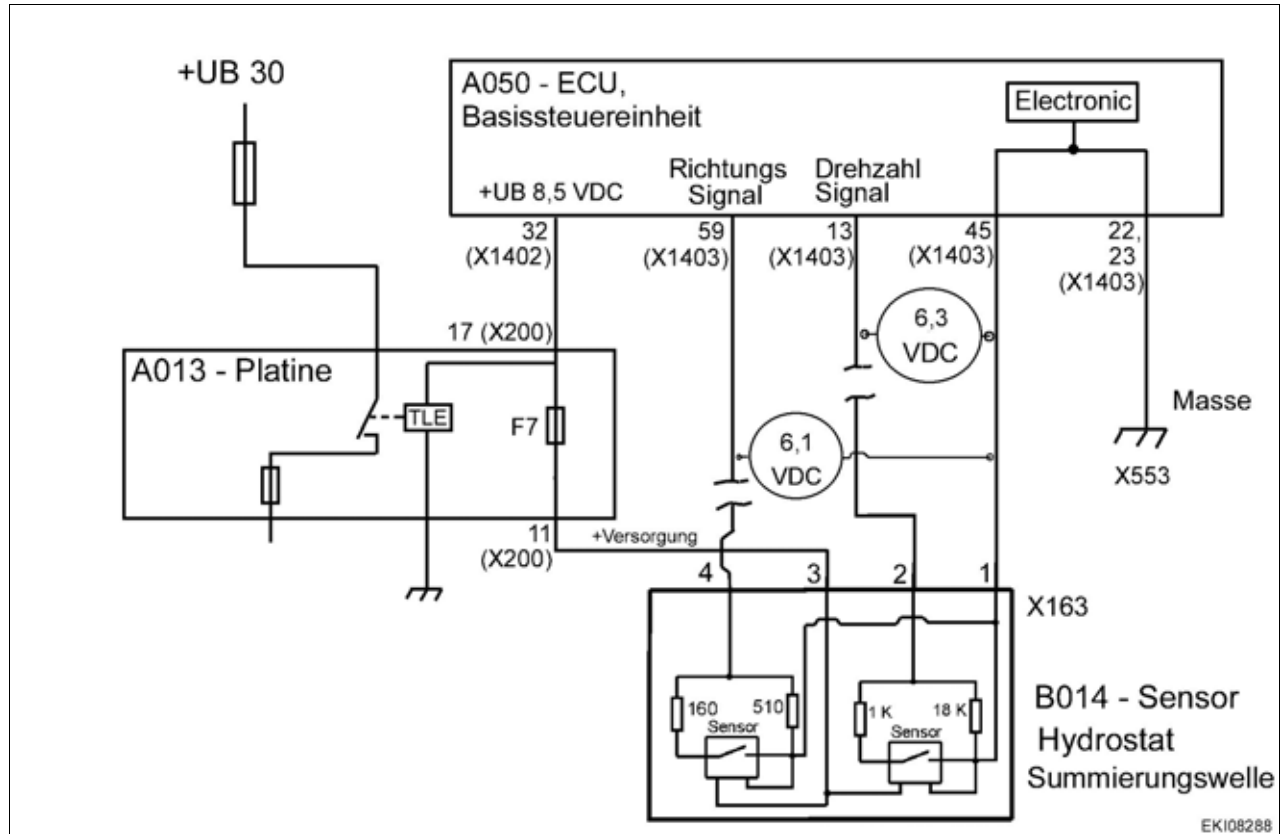


Fig. 186.

NOTE: B014 - Sensor, Hydrostat Summierungswelle einbauen

52 B015 sensor, bevel pinion

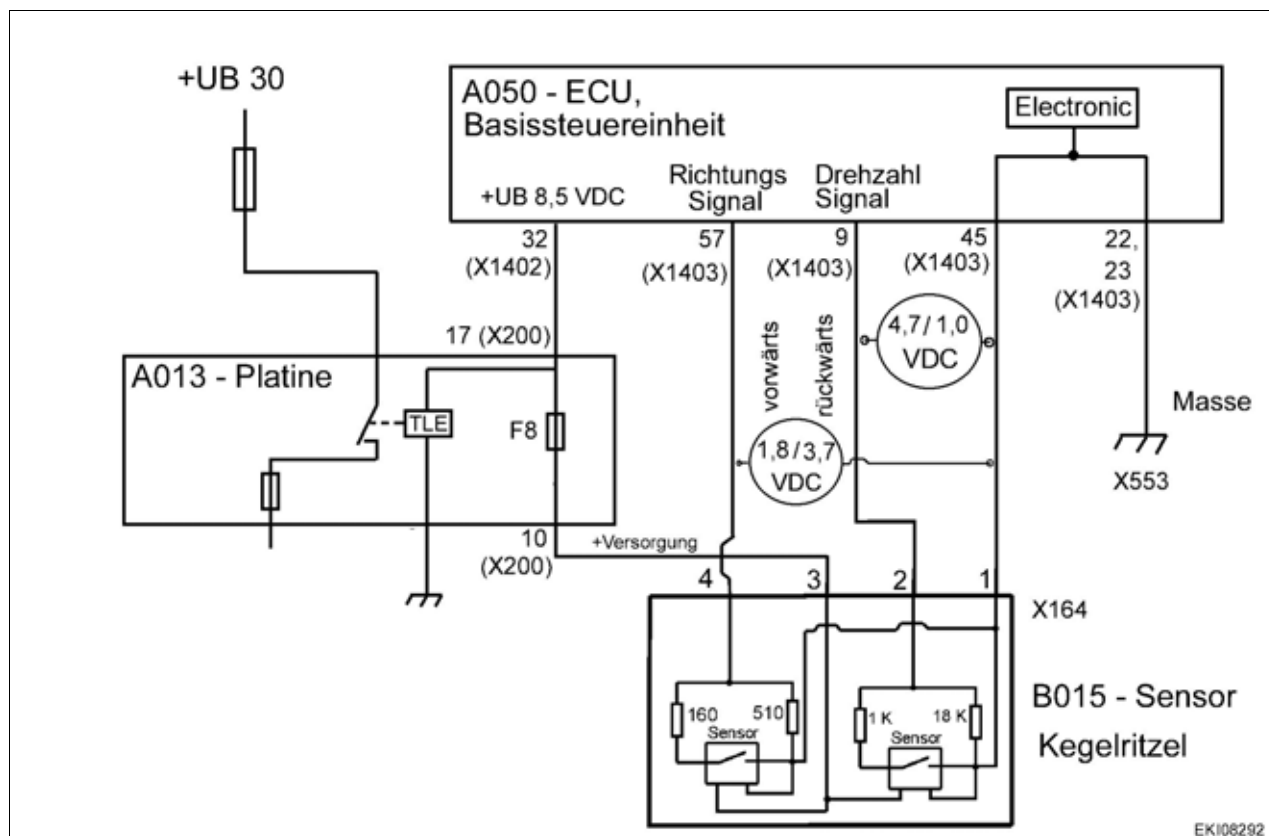


Fig. 187.

EK106292

1001939

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

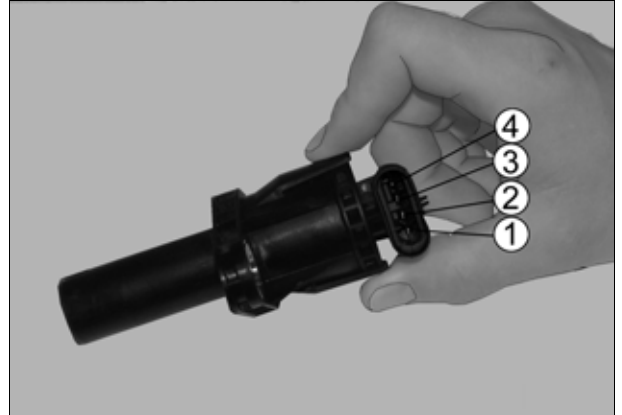


Fig. 188.

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	3	8.5 VDC		Microfuse (no. 8) in A013 - PCB, microfuses or in wiring set
Earth	1			
Signal, speed	2	4.7/1.0 VDC	Tractor stationary (depending on ratchet wheel setting)	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
Earth	1	3.0 VDC	Tractor moving	
Signal, rotational direction	4	1.8 VDC	Tractor advancing	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
Earth	1	3.7 VDC	Tractor reversing	

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

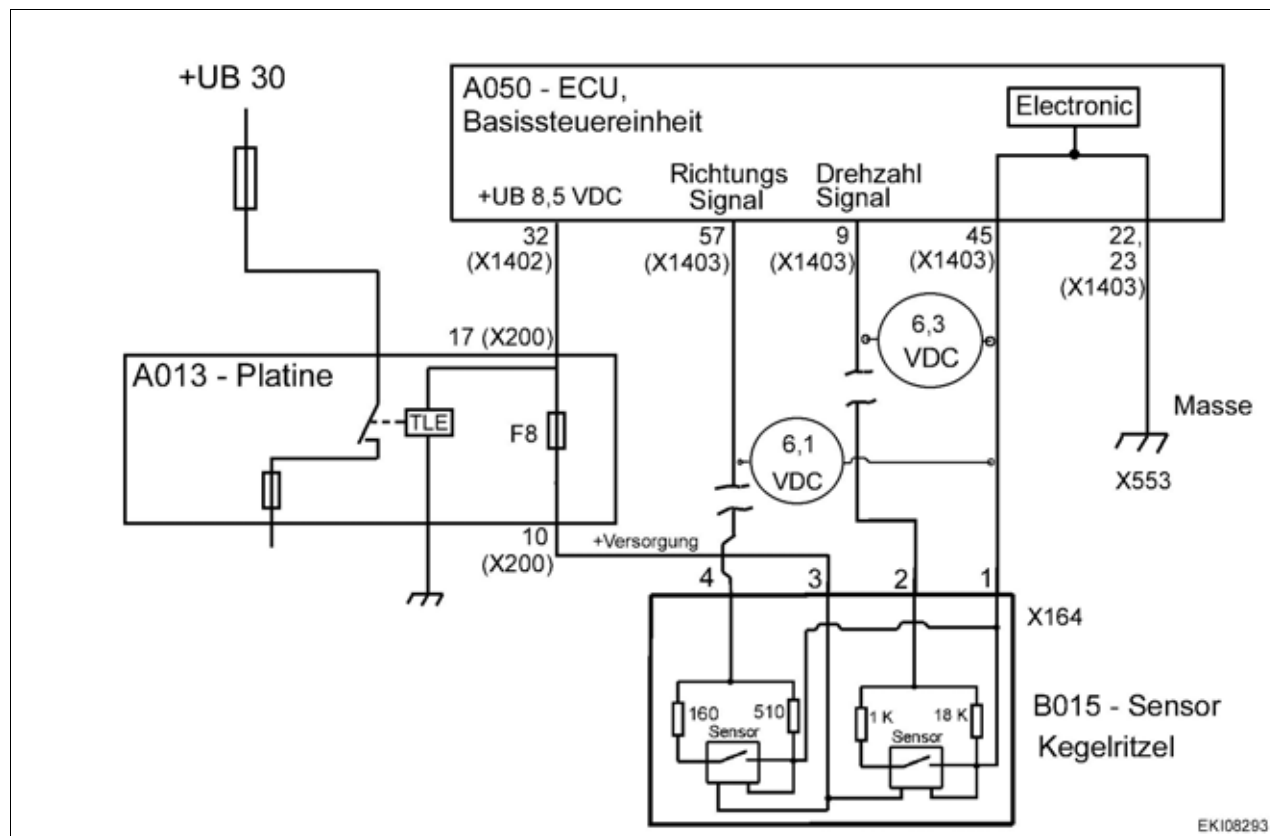


Fig. 189.

I001940

NOTE: B015 - Sensor, Kegelritzel einbauen

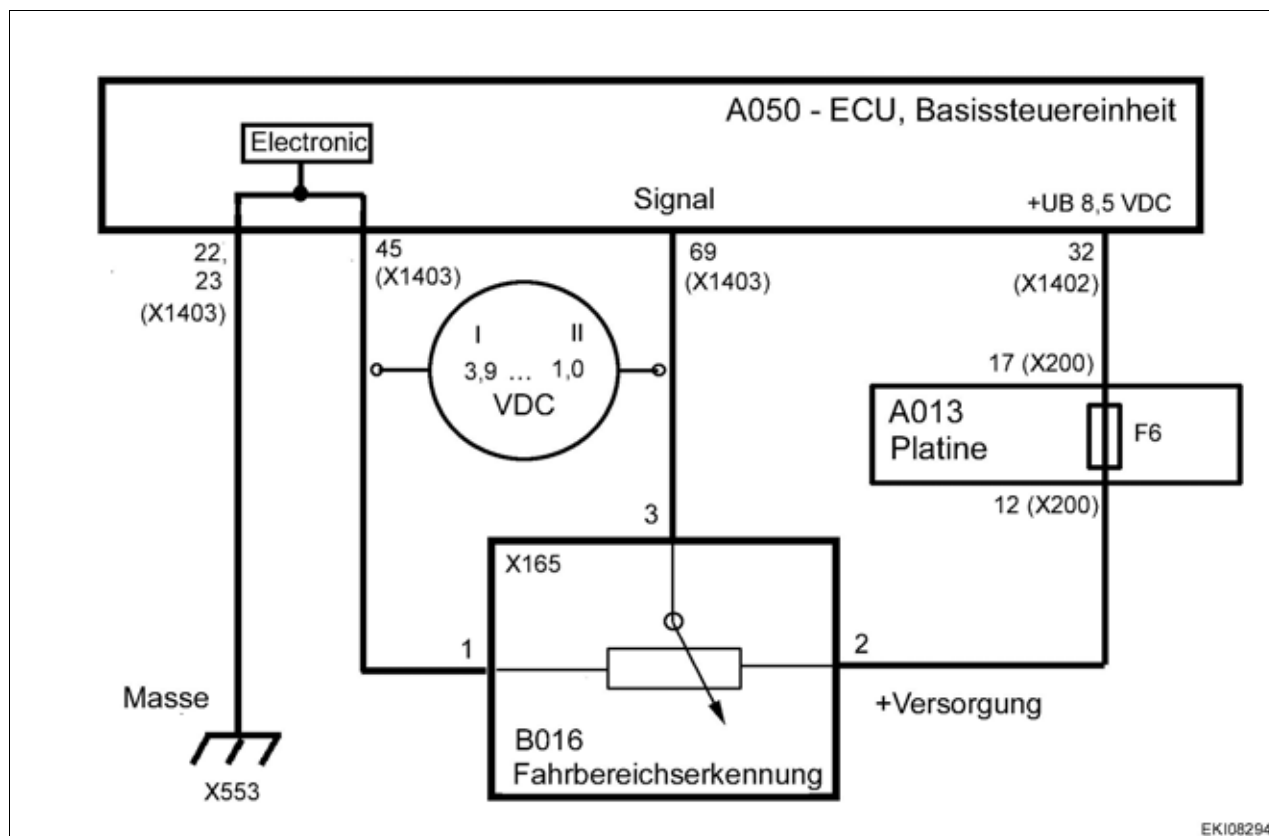
53 B016 sensor, travel range detection

Fig. 190.

EKI08294

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

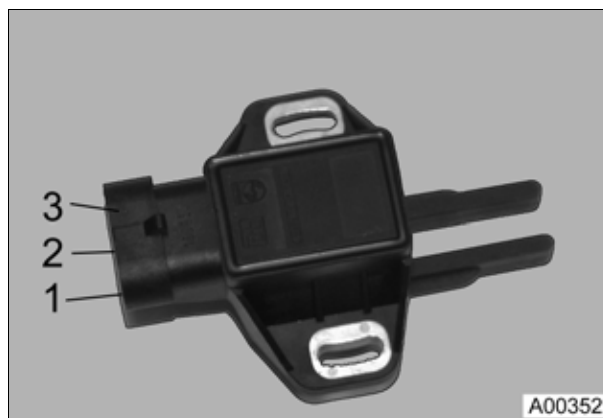


Fig. 191.

1001451

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

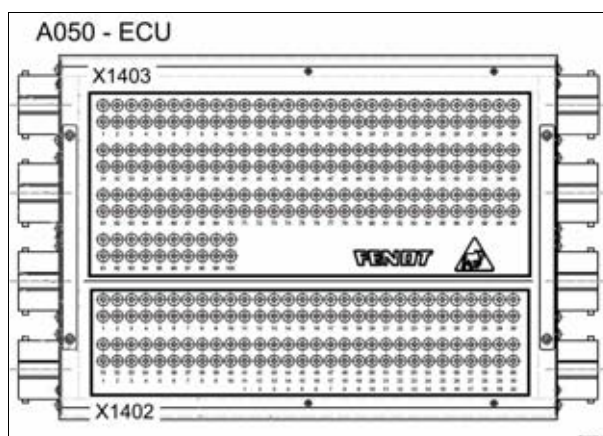


Fig. 192.

1001874

Possible cause of fault

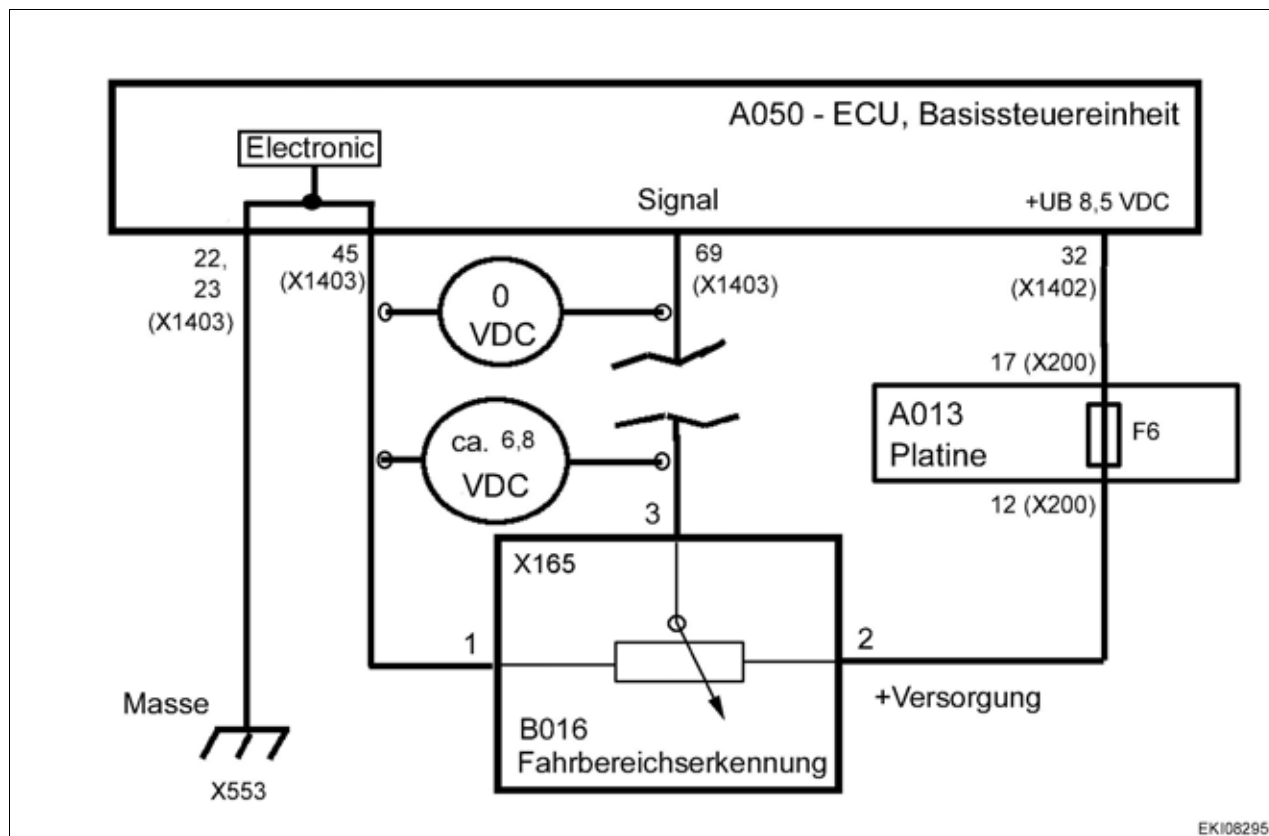


Fig. 193.

EKI08295

I001942

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

54 B017 sensor, clutch pedal

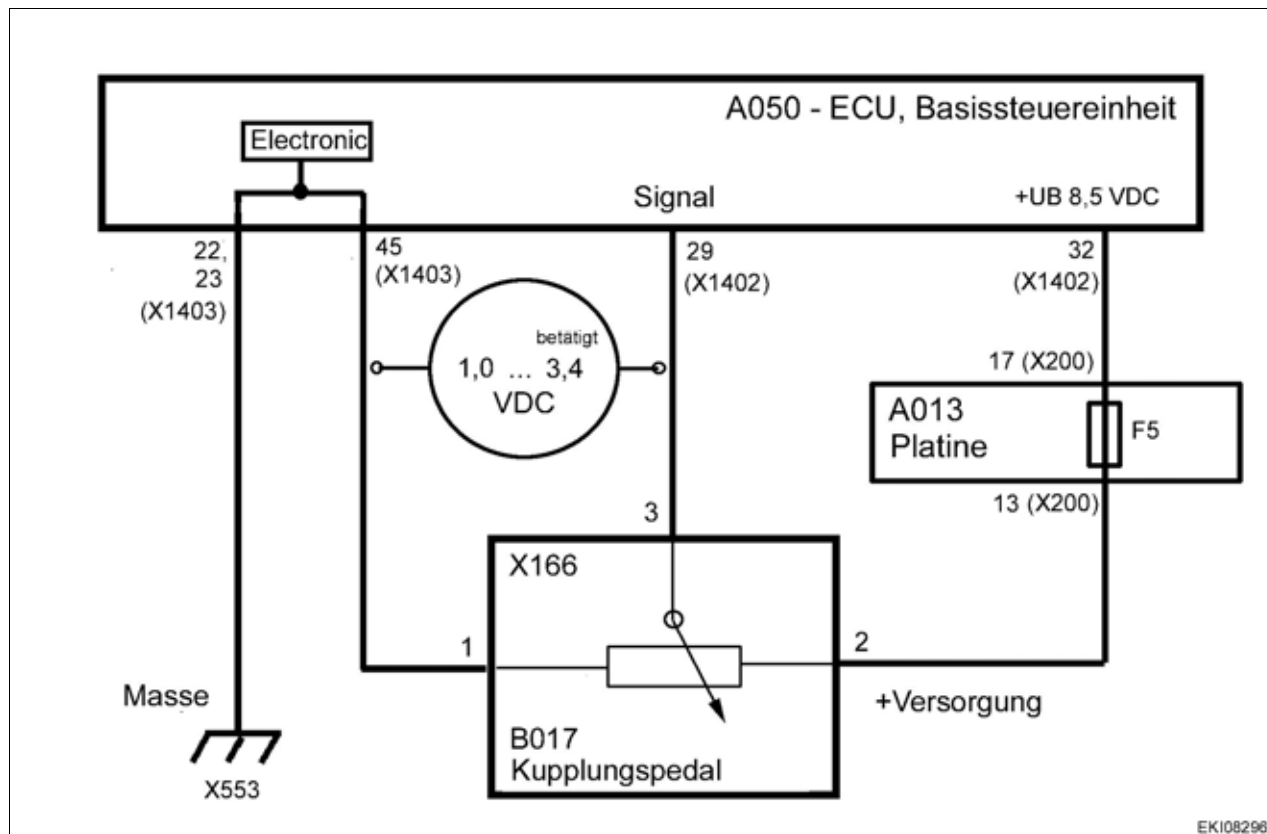


Fig. 194.

EK108298

1001943

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

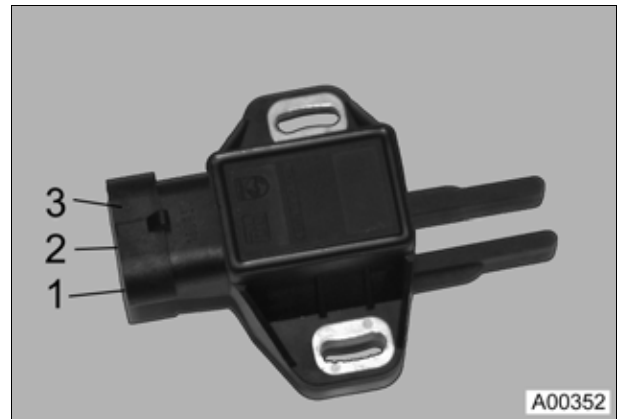


Fig. 195.

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

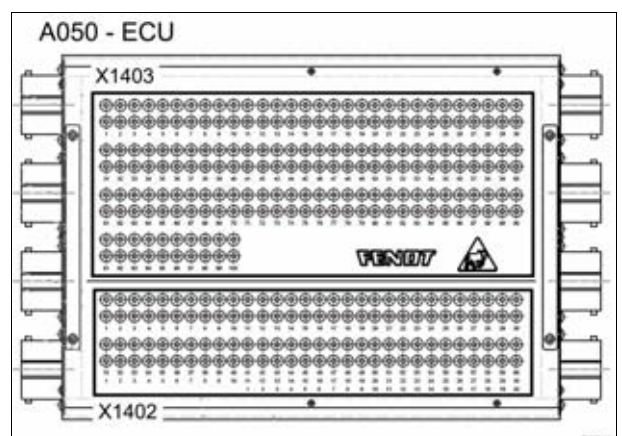


Fig. 196.

I001874

Possible cause of fault

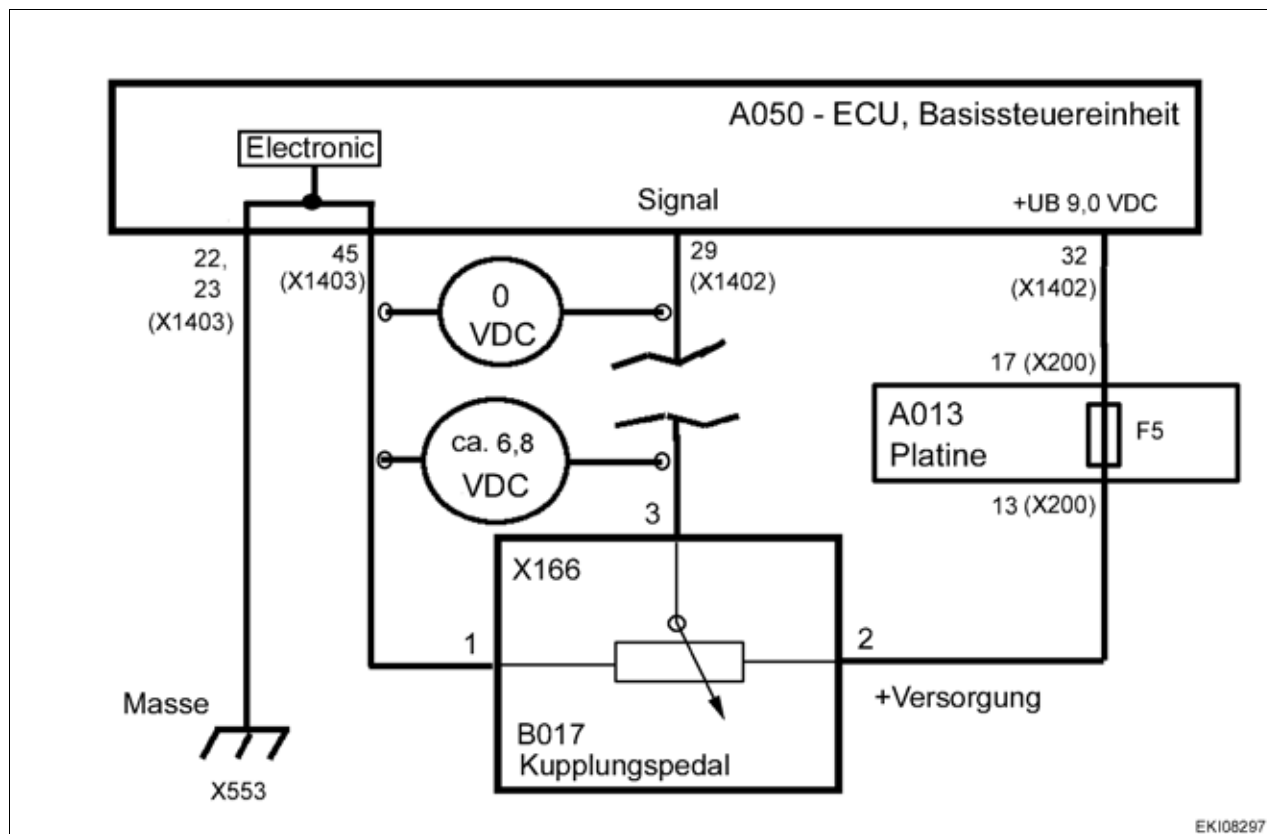


Fig. 197.

NOTE: The **B017** - Sensor, clutch pedal must be calibrated
[see §13](#)

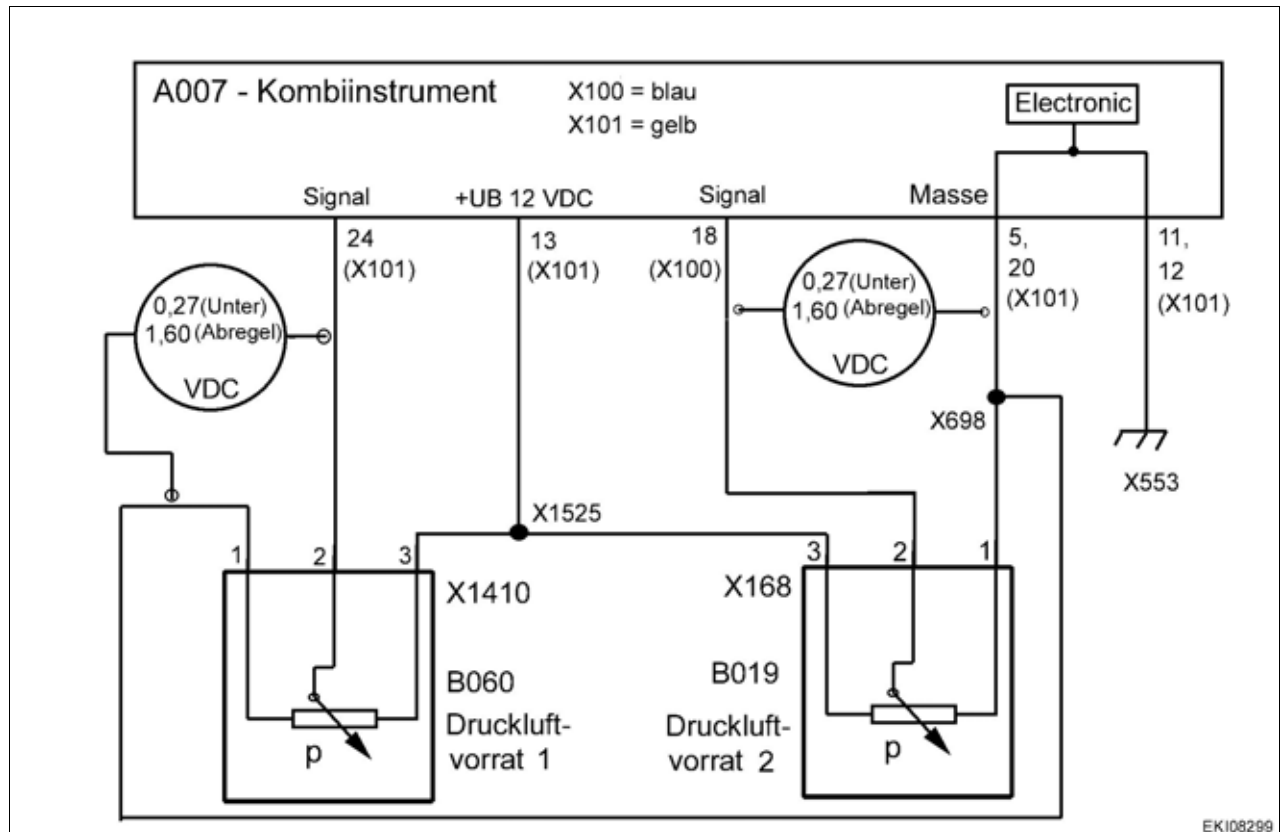


Fig. 198.

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

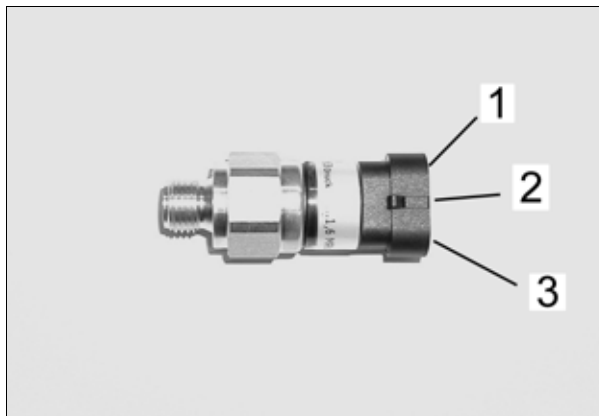


Fig. 199.

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.

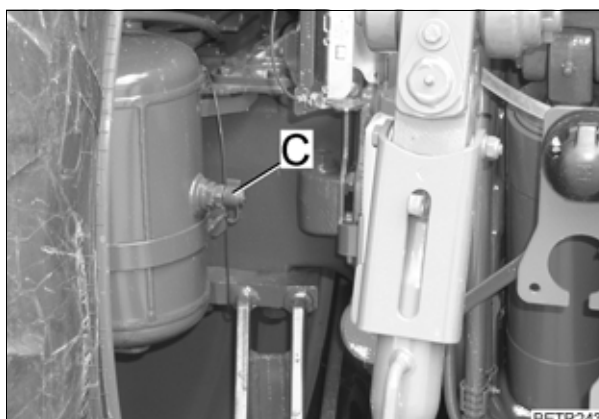


Fig. 200.

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.

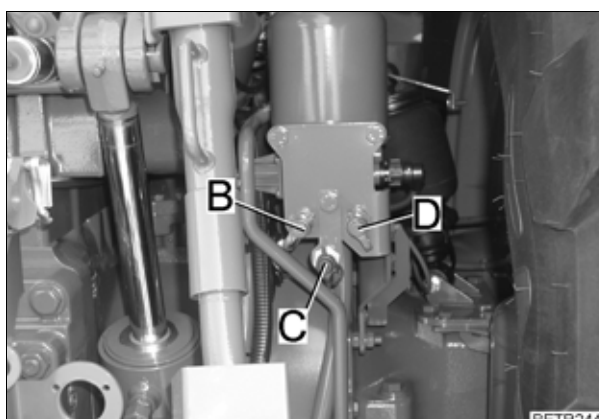


Fig. 201.

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

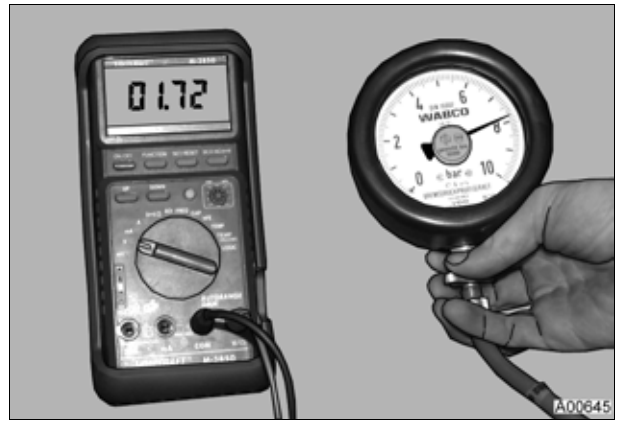


Fig. 202.

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

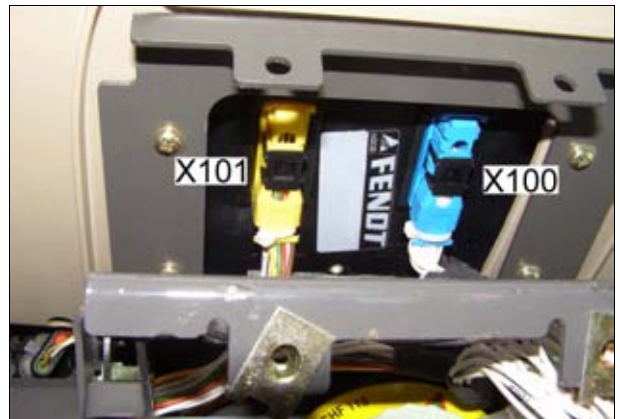


Fig. 203.

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.

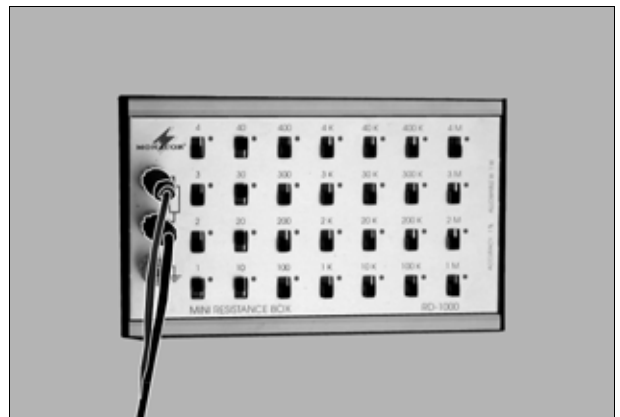


Fig. 204.

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.

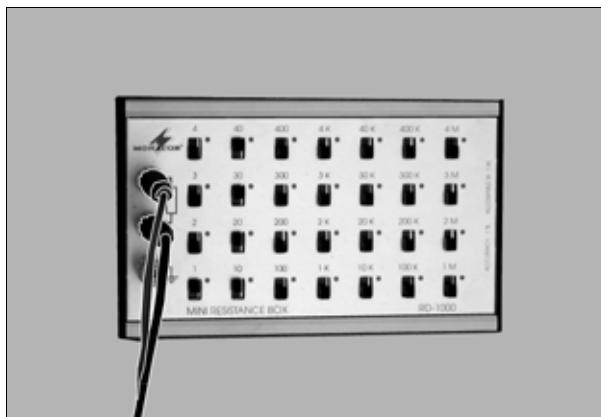
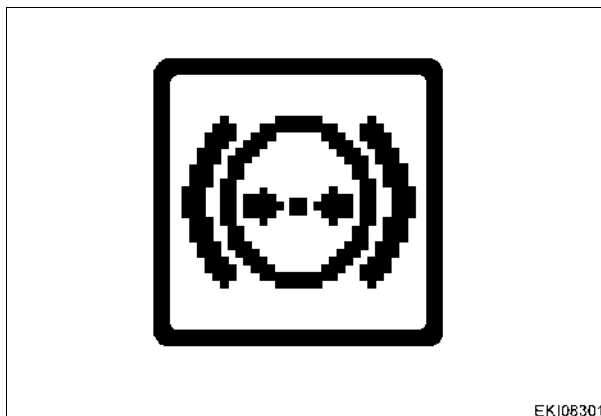


Fig. 205.

1000650

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.



EK106301

Fig. 206.

1001467

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.

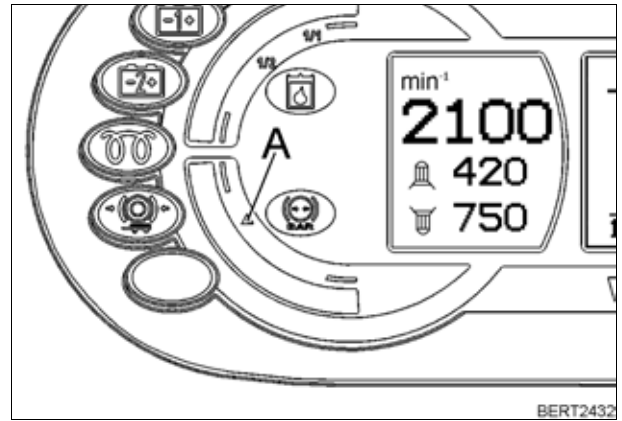


Fig. 207.

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)

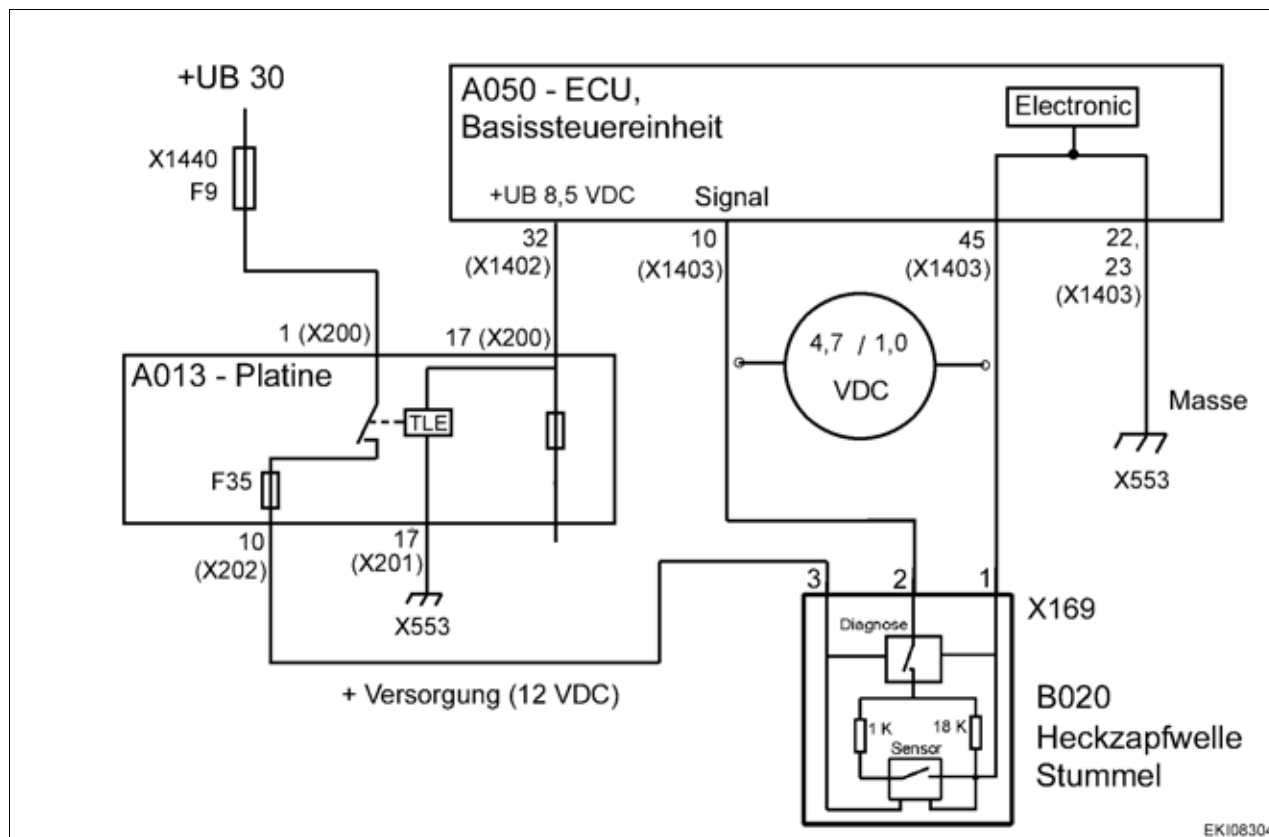


Fig. 208.

EK108304

1001945

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

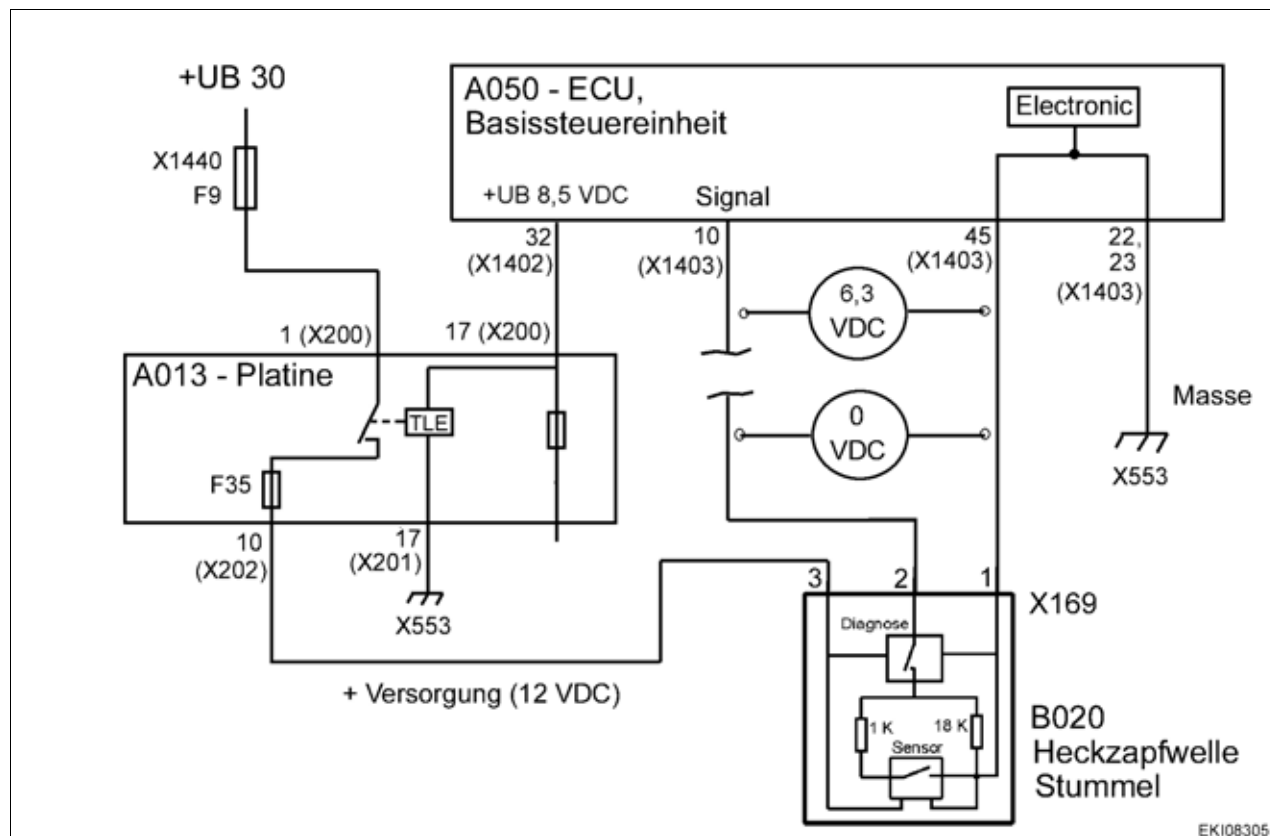


Fig. 210.

EKI08305

1001946

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)

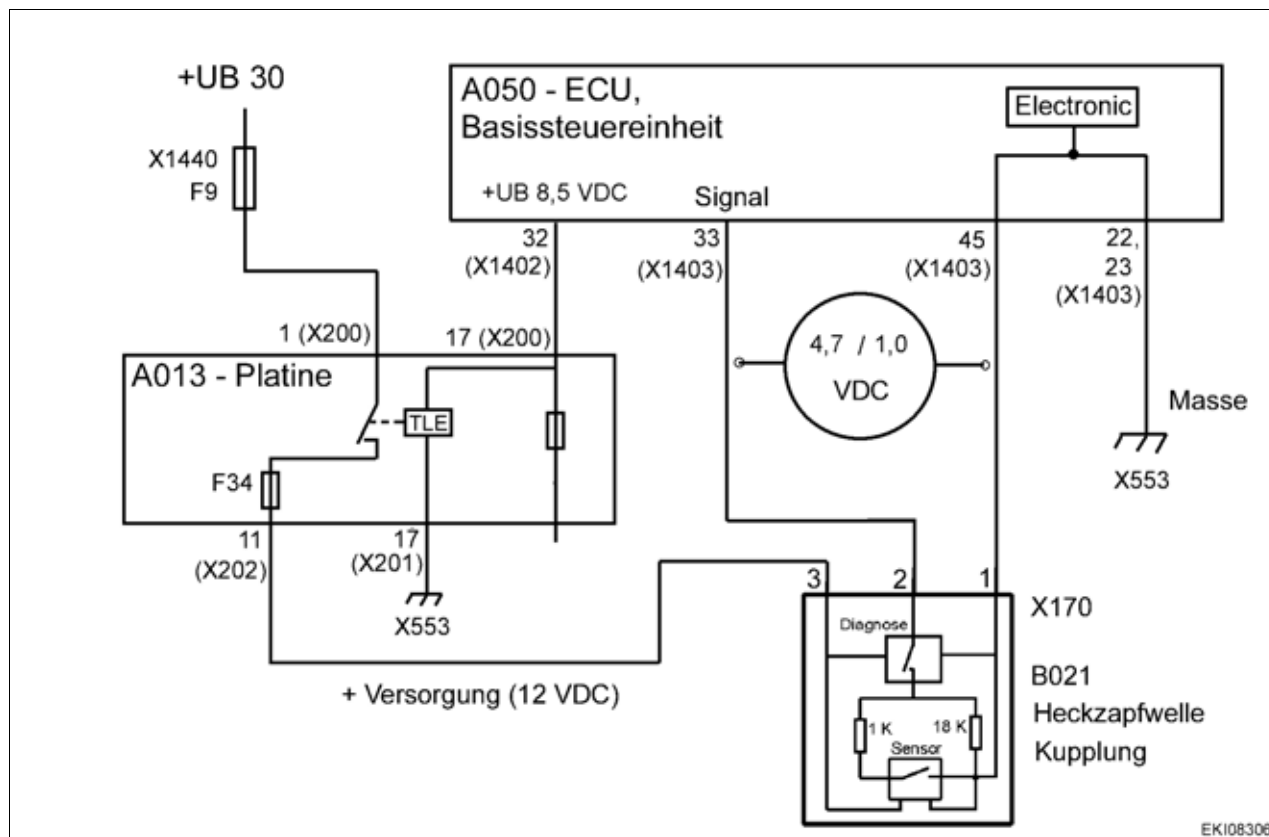


Fig. 211.

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.

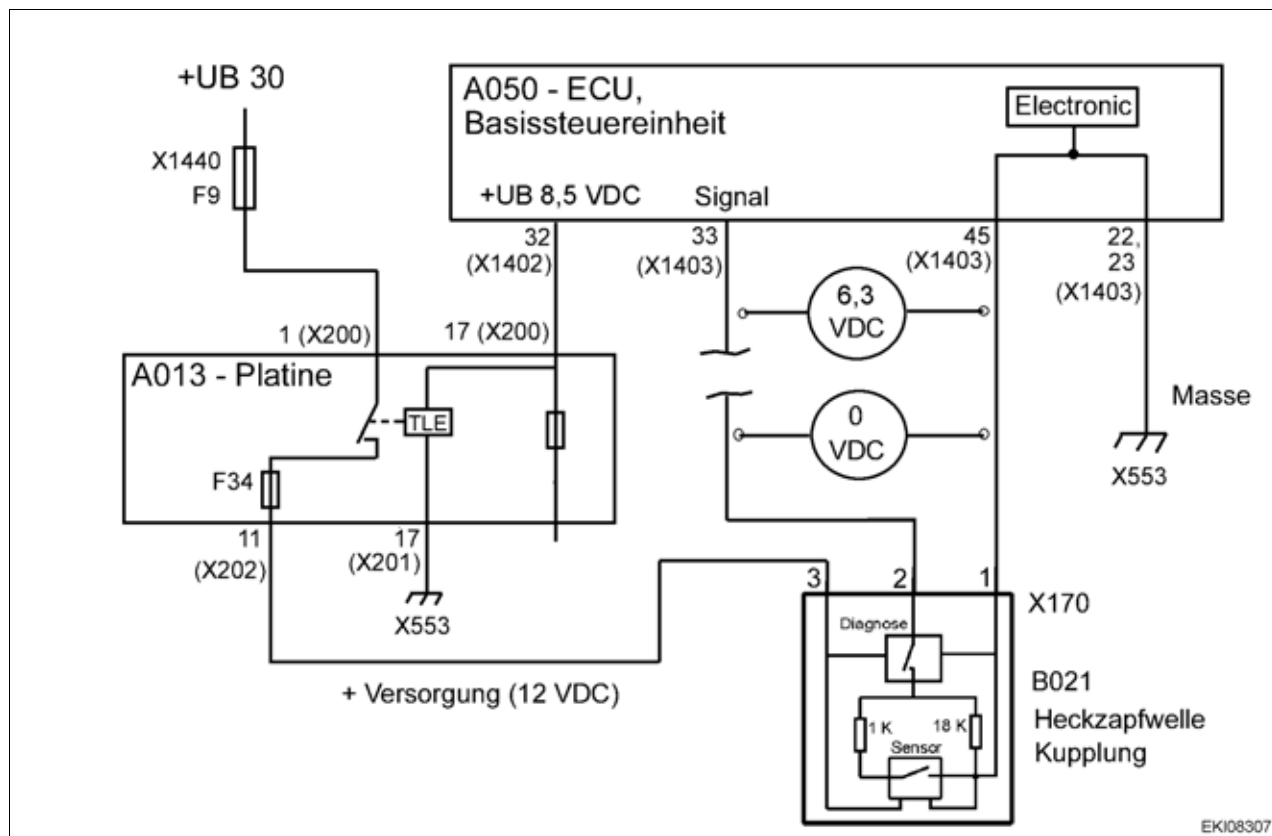
All readings +/- 10%

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



NOTE: see §1

58 B030 sensor, rear power lift position

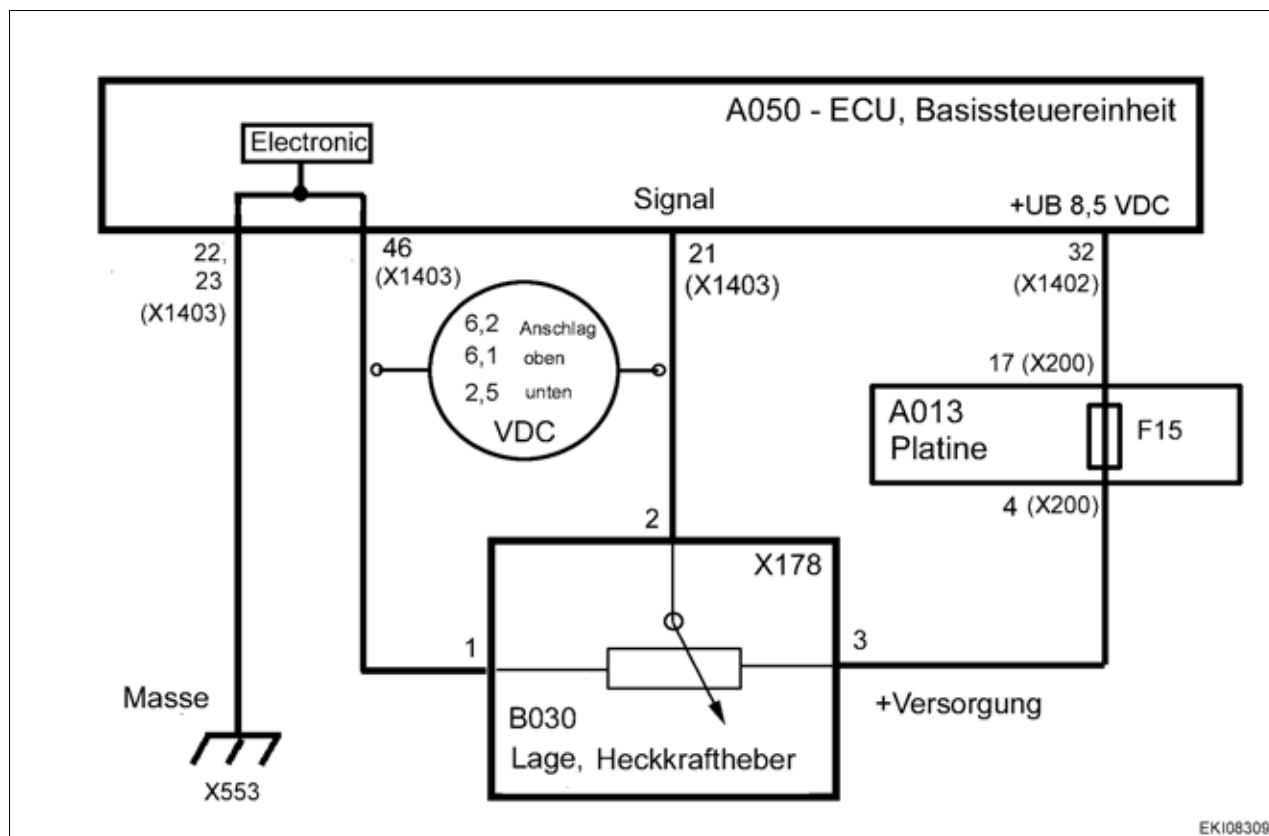


Fig. 214.

EKI08309
 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

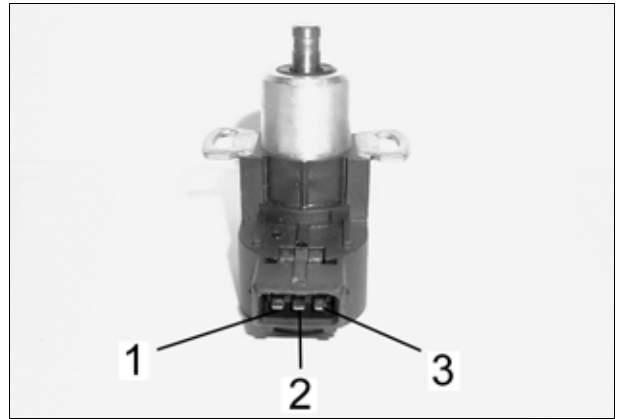


Fig. 215.

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

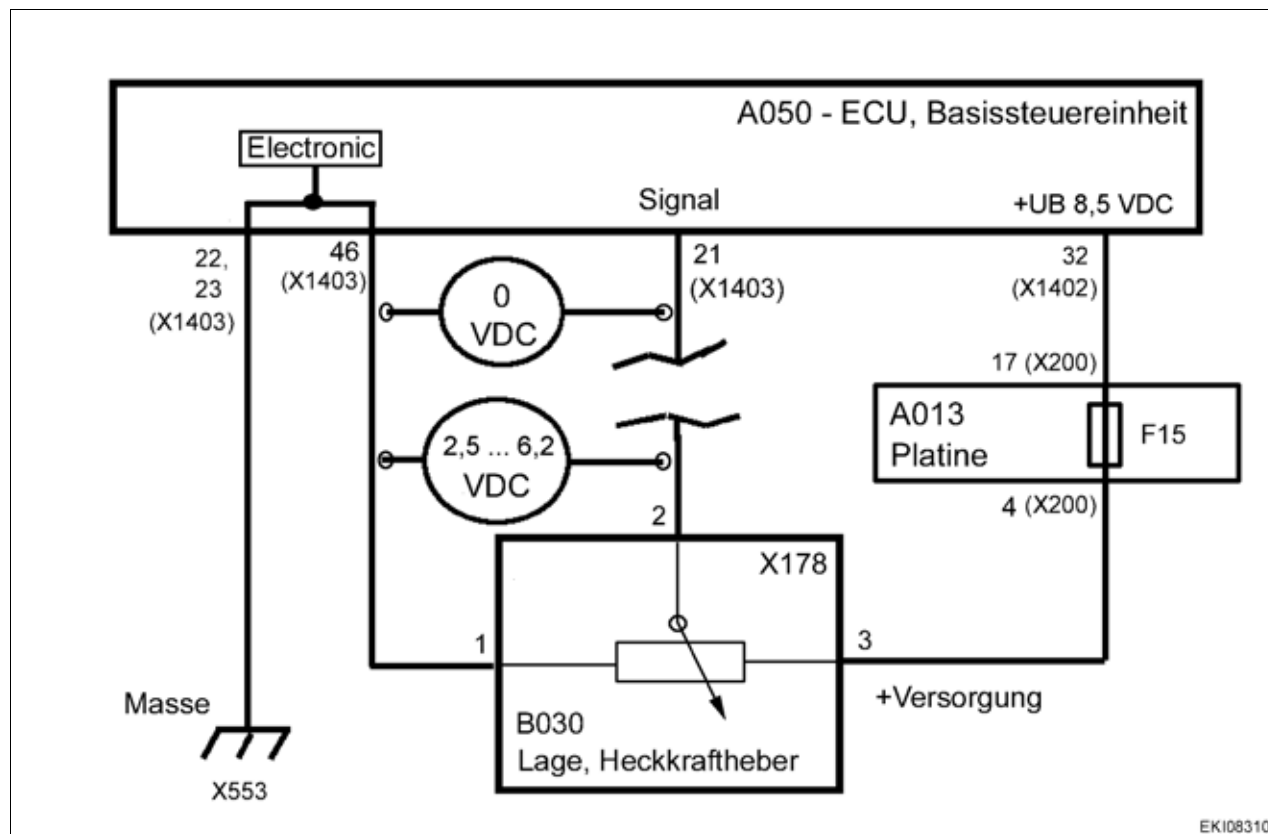


Fig. 216.

EKI08310

1001950

NOTE: *see §2*
see §7

59 B031/B032 right/left draught sensing pin

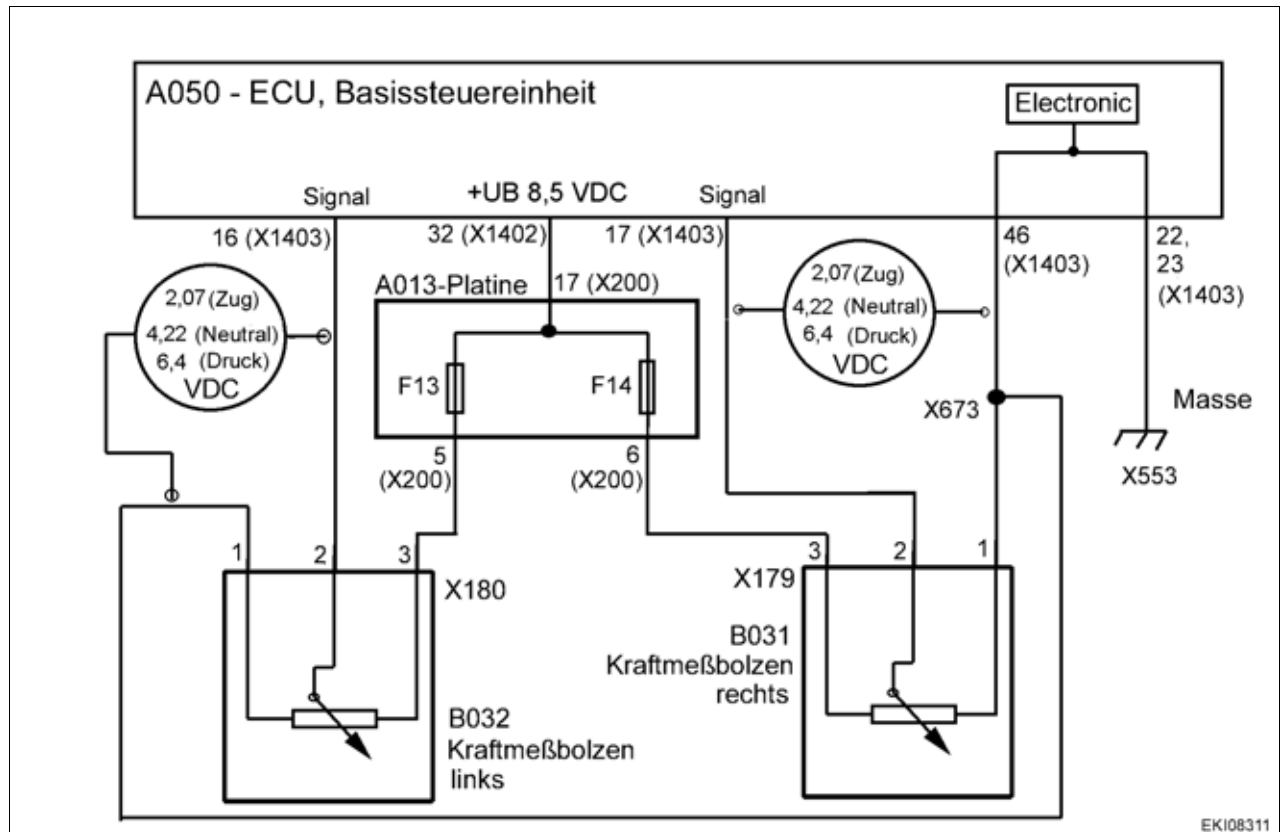


Fig. 217.

EKI08311

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, draught 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, draught 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

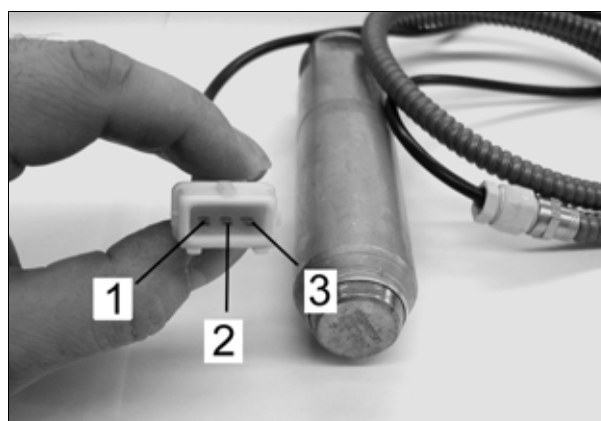


Fig. 218.

I000661

NOTE: Connect the X899.980.246.202 adapter cable directly to the **B031** - Sensor, draught sensing pin, right, **B032** - Sensor, draught 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
Earth	1			- Microfuse no. 14 (B031 right draught sensing pin) - Microfuse no. 13 (B032 left draught sensing pin) or within wiring set

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.
		4.22 VDC +/- 10%	Neutral	
		6.40 VDC	Pressure force	
Earth	1			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.

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)

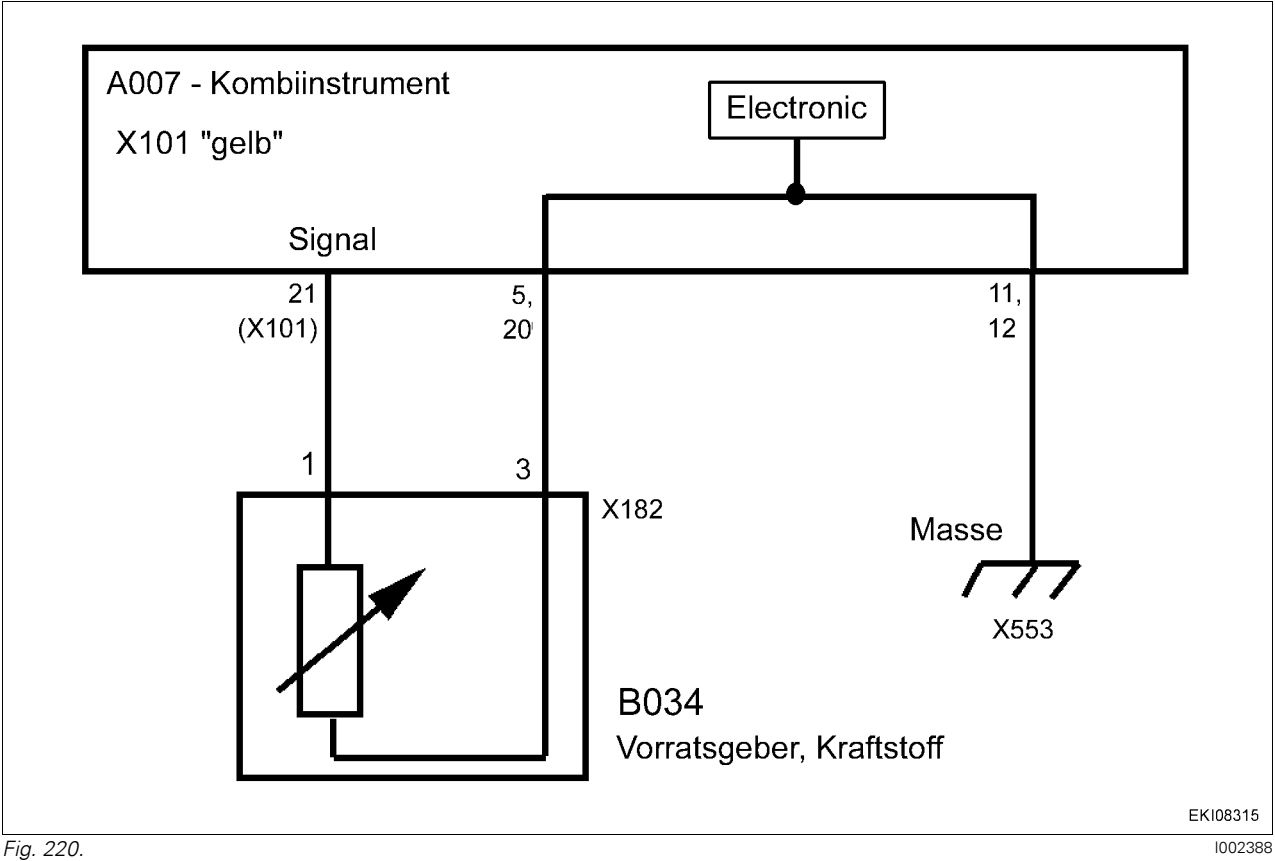


Fig. 220.

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

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.

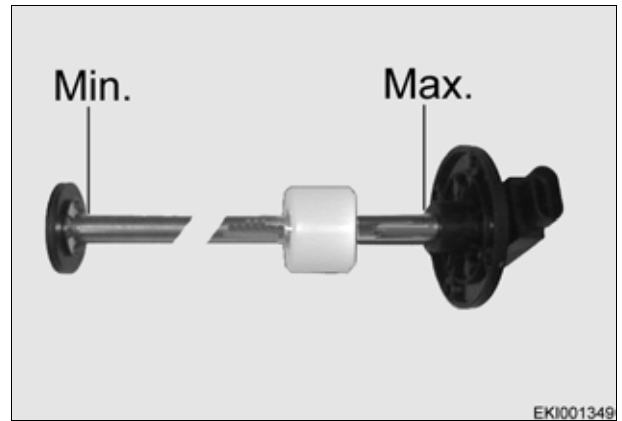


Fig. 221.

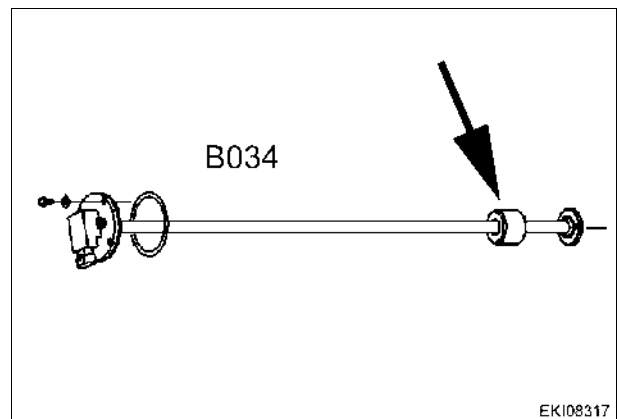
EKI001349
I001509

Fig. 222.

EKI08317
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

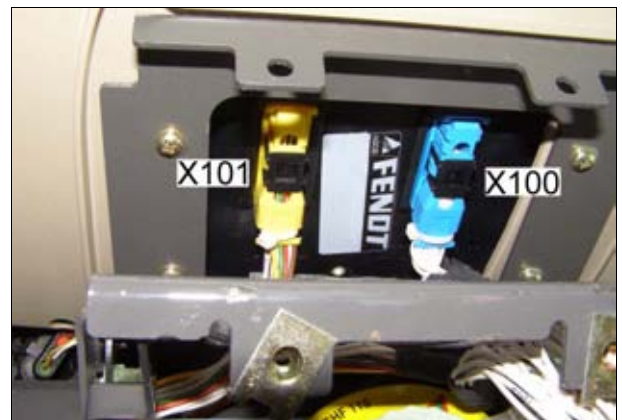


Fig. 223.

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.

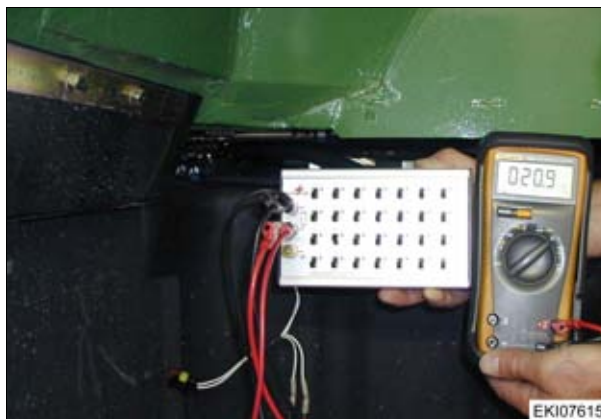


Fig. 224.

1001514

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

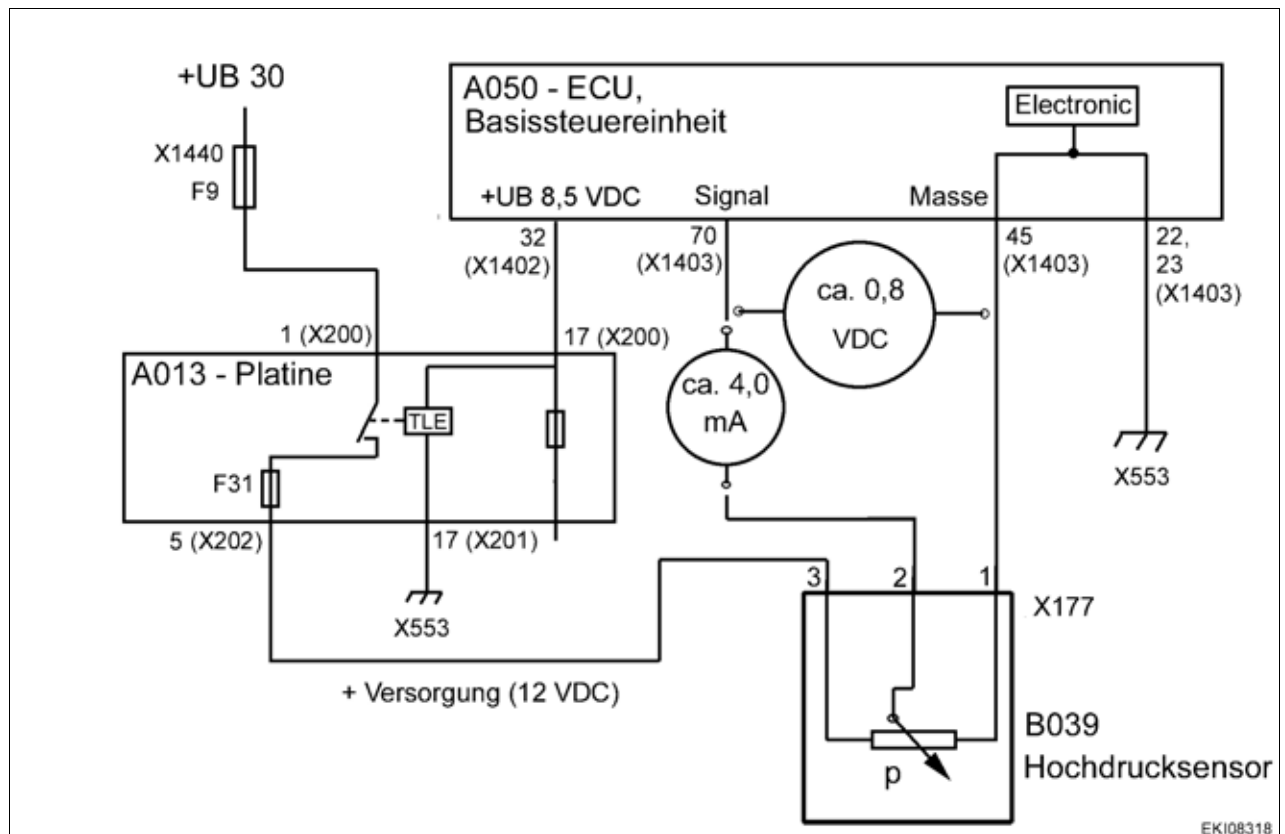


Fig. 225.

Item	Designation	Note
A013 - PCB, microfuses (microfuse no. 31)		
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 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, microfuses (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

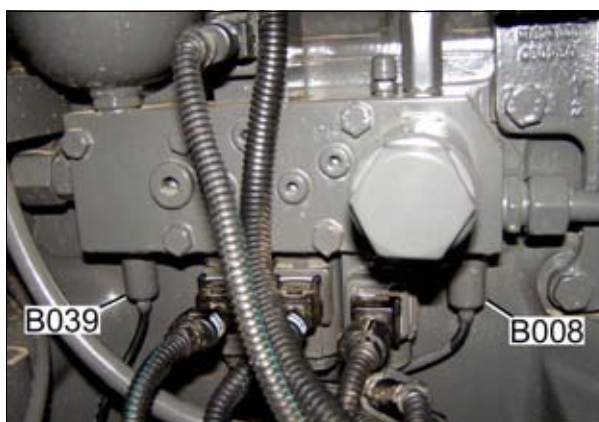


Fig. 226.

1001057

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)

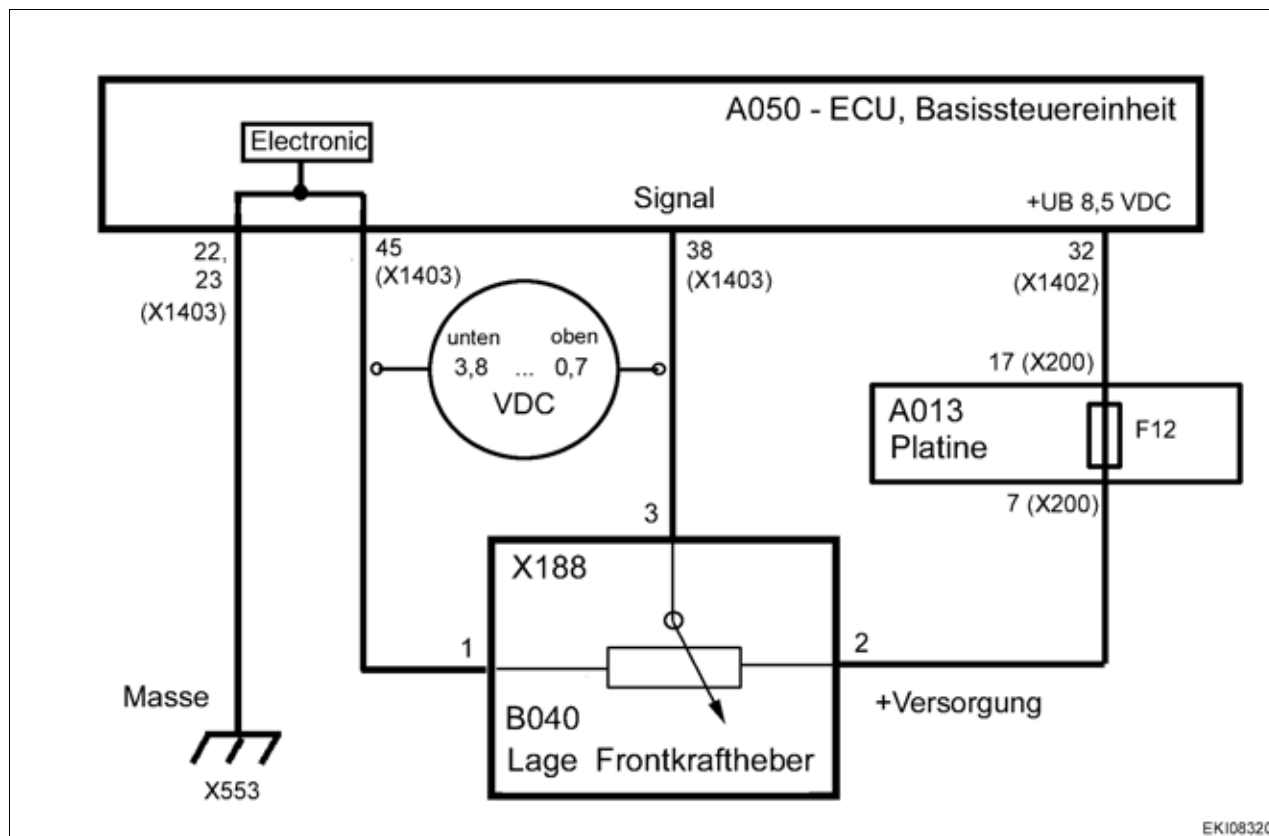


Fig. 227.

EK108320
 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

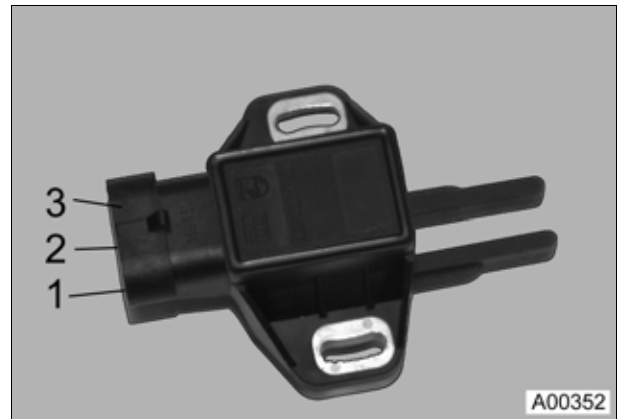


Fig. 228.

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

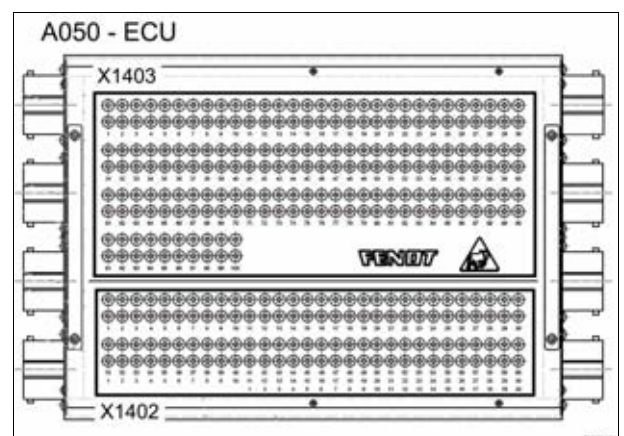


Fig. 229.

I001874

Possible cause of fault

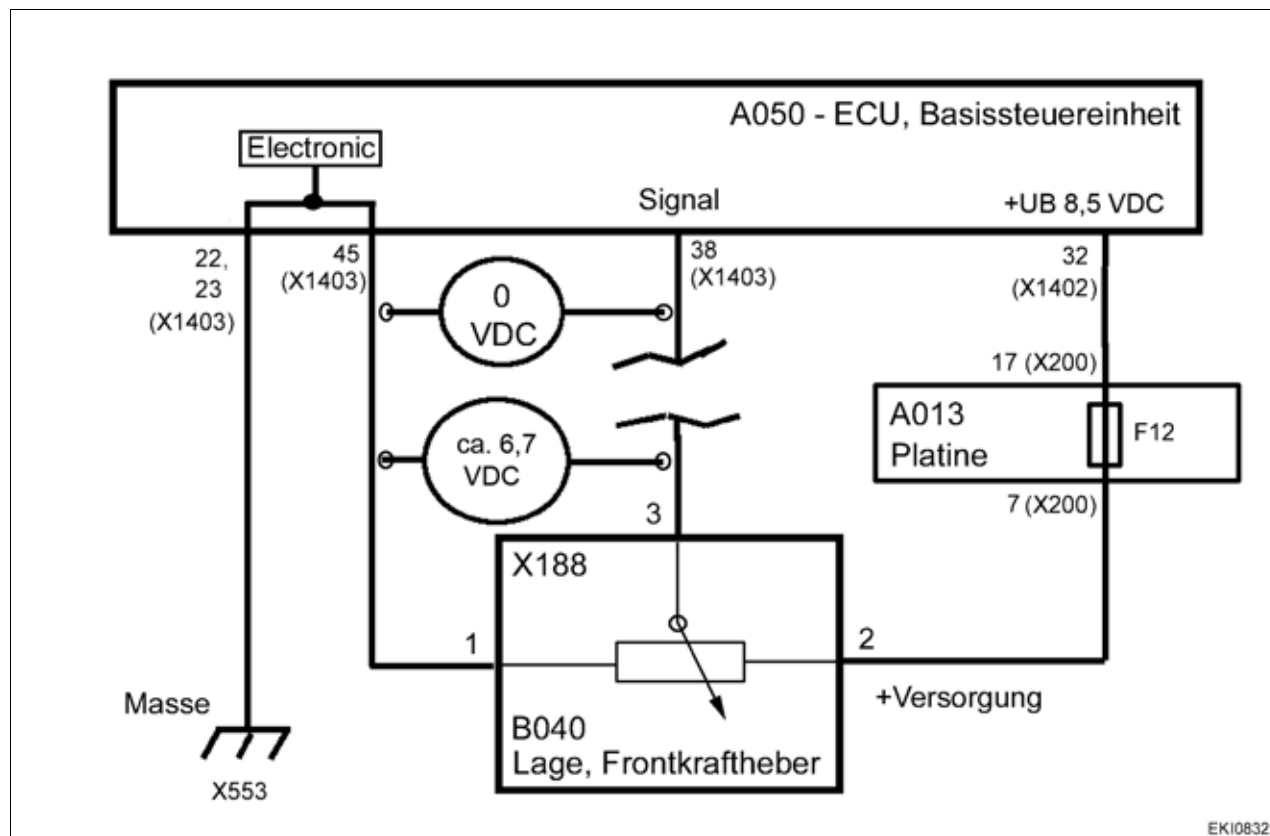


Fig. 230.

NOTE: The B040 position sensor must be calibrated.

see §3

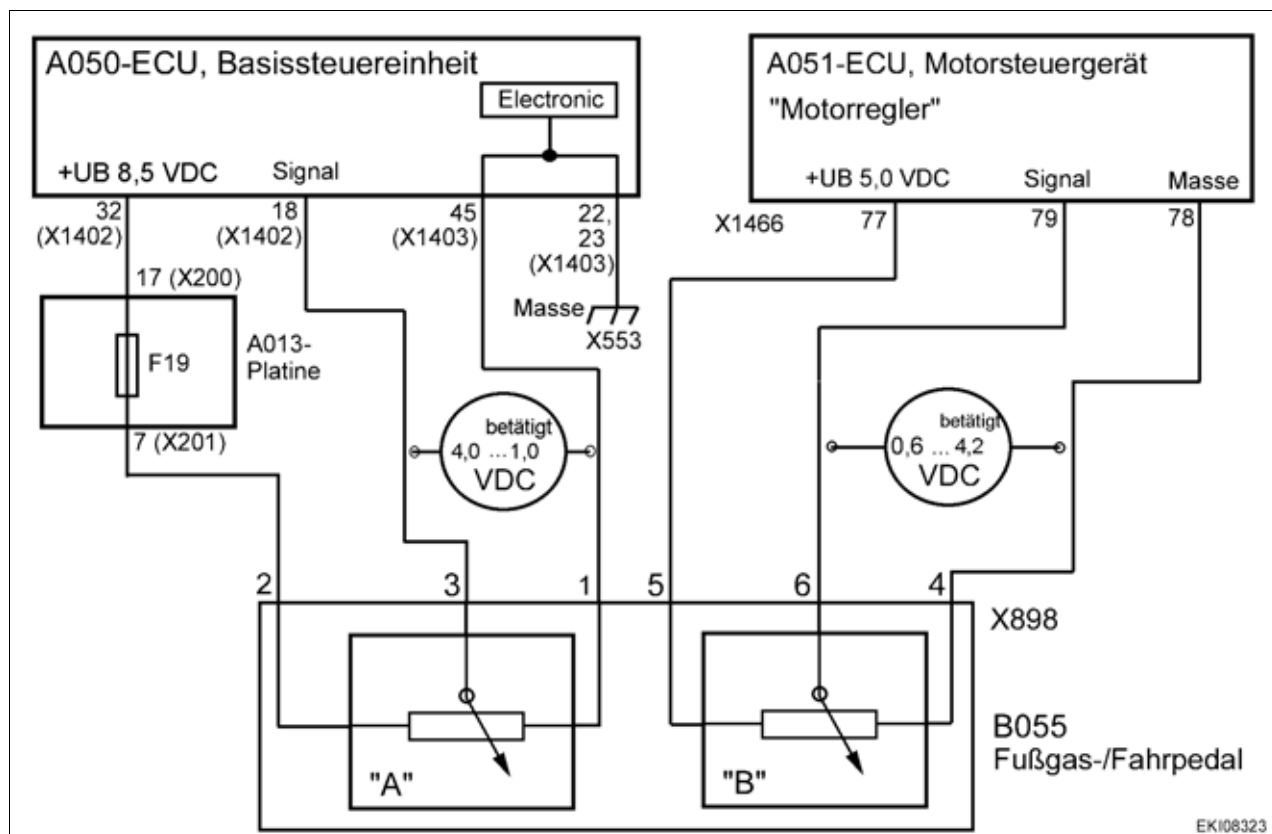
63 B055 sensor, foot throttle

Fig. 231.

EKI08323

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.

1001074

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

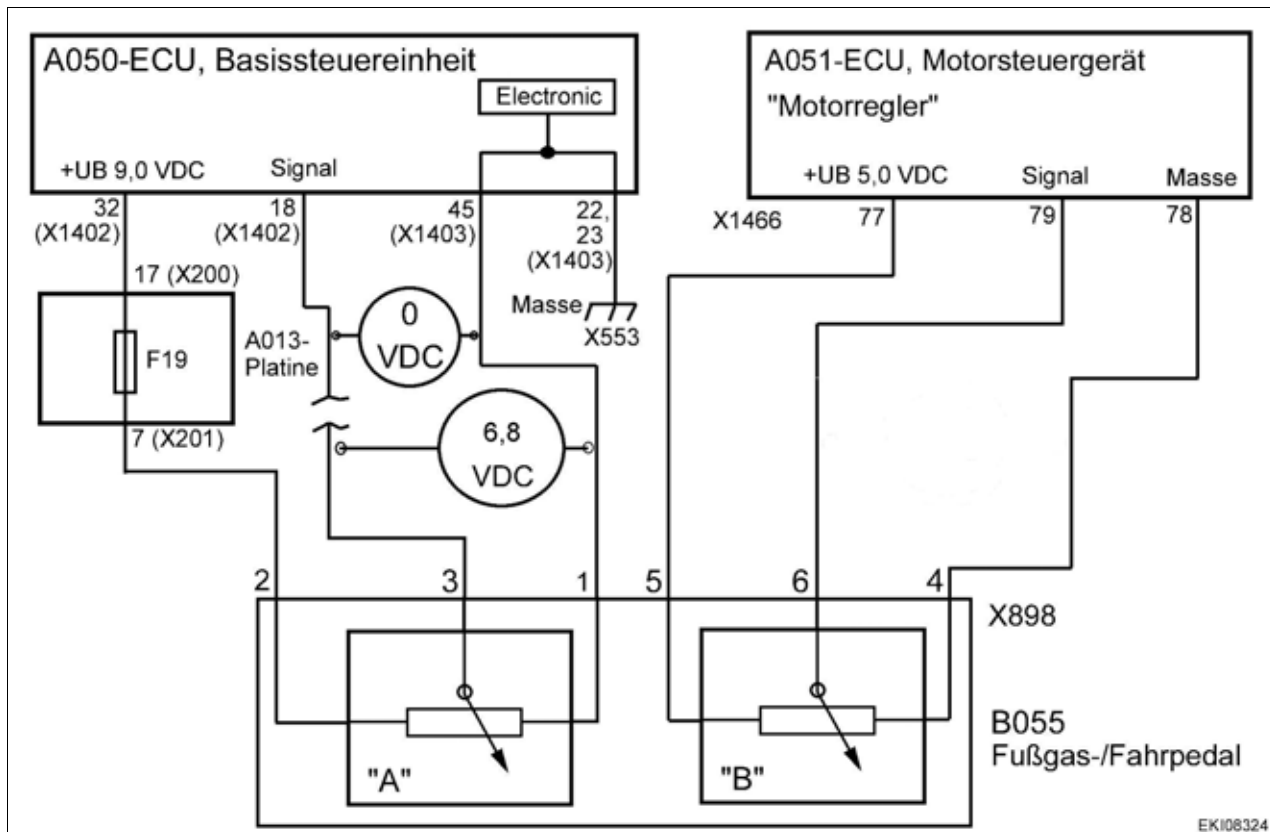


Fig. 233.

EK108324

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

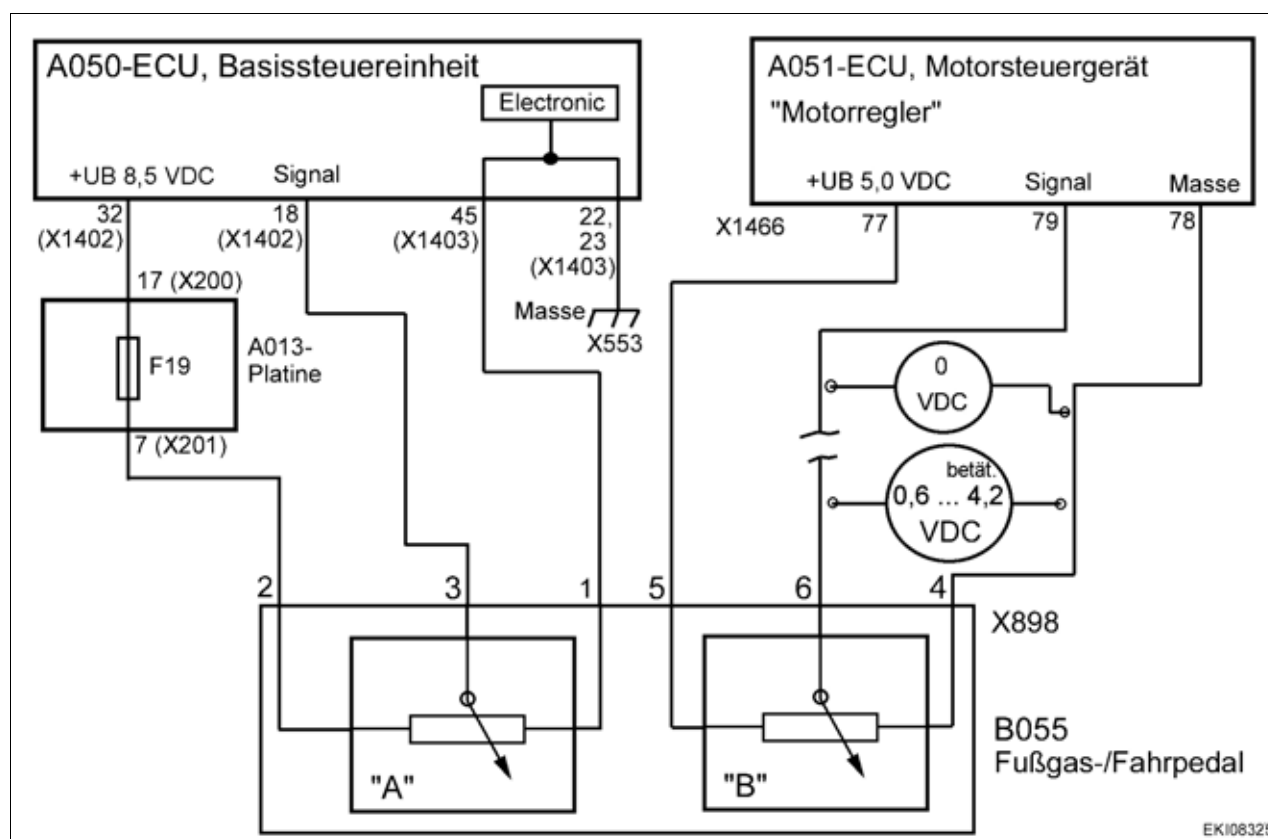


Fig. 235.

EKI08325

1002056

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

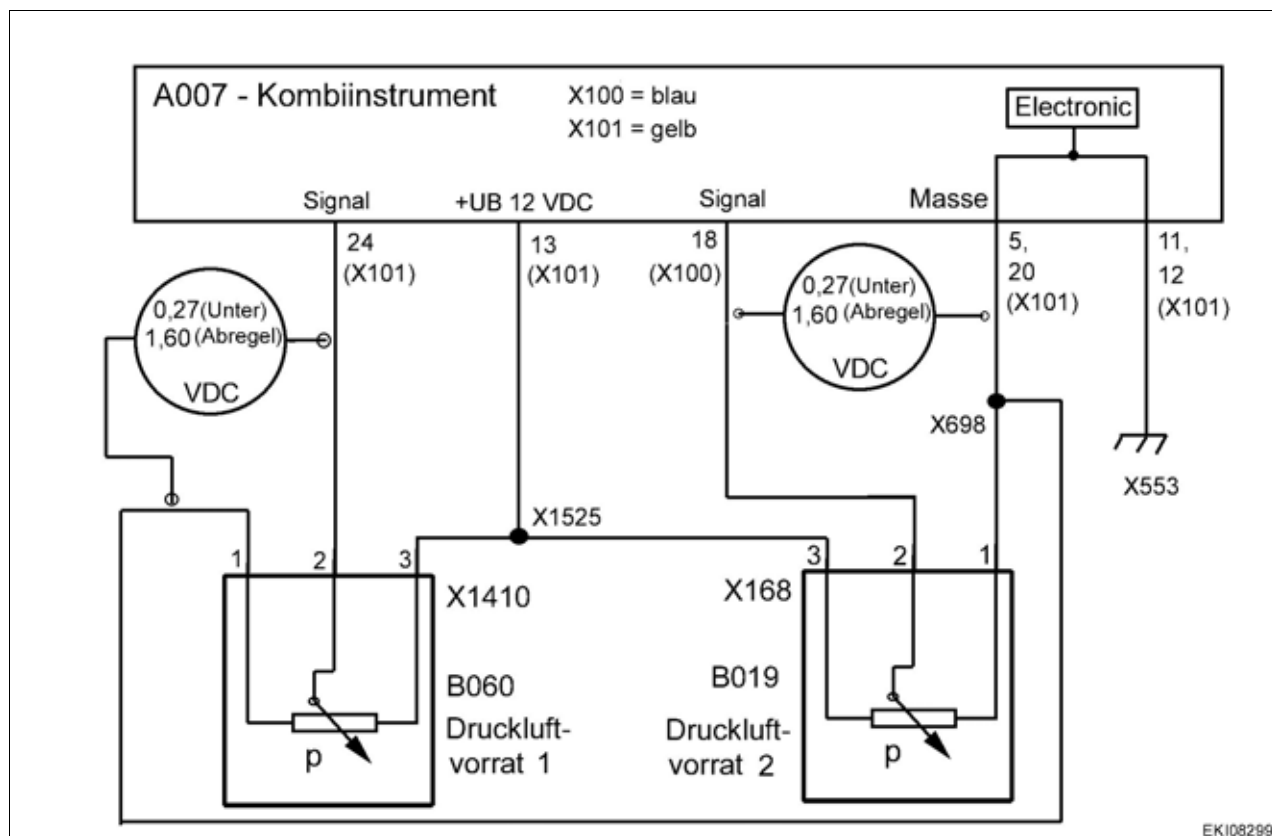
64 B019/B060 compressed air supply sensor

Fig. 236.

EK108299

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

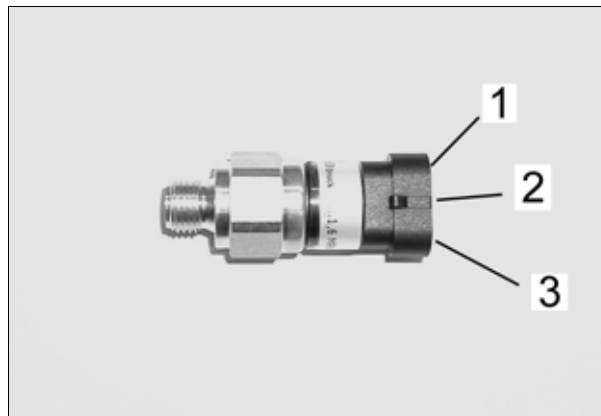


Fig. 237.

1000647

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.

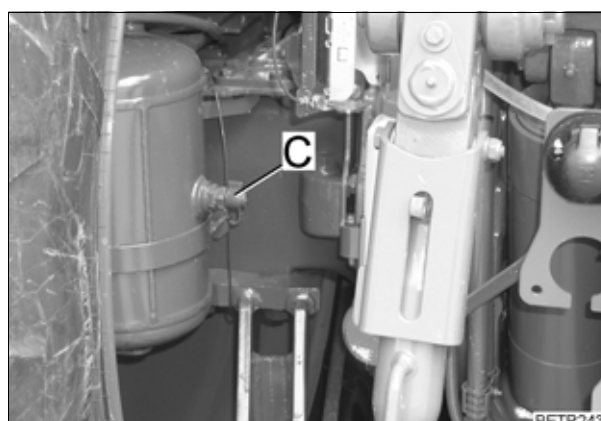


Fig. 238.

1001460

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.

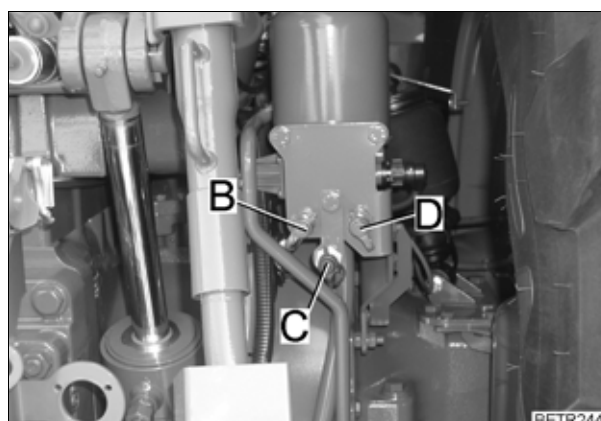


Fig. 239.

1001461

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

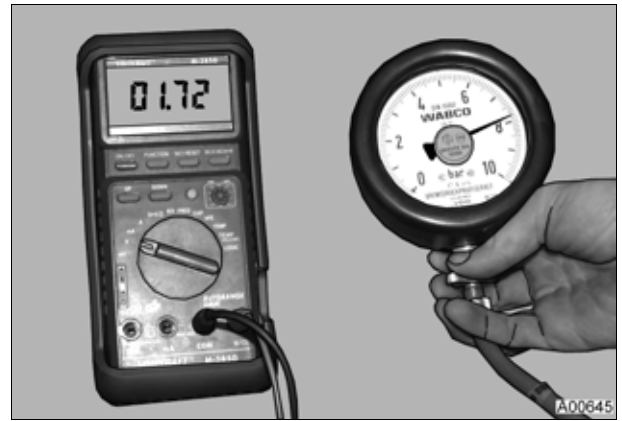


Fig. 240.

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

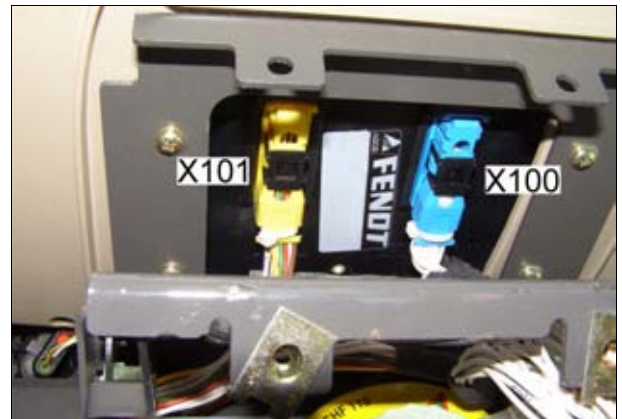


Fig. 241.

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.

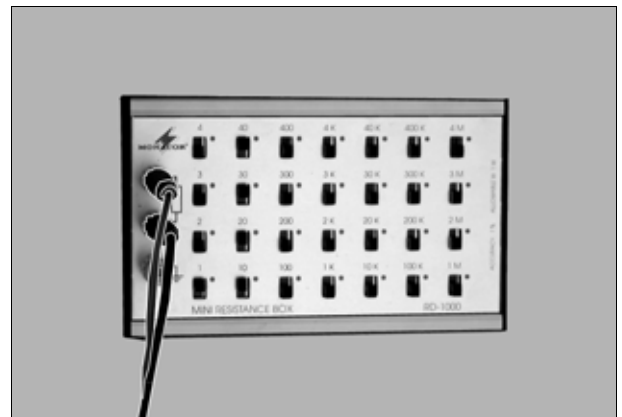


Fig. 242.

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.

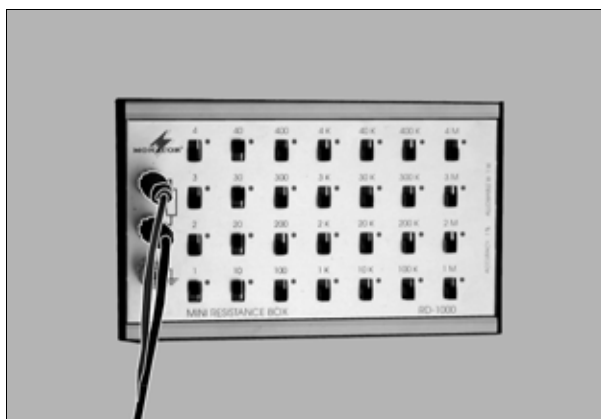


Fig. 243.

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.

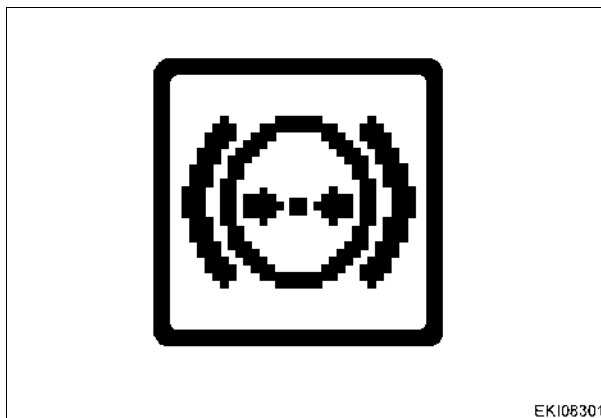


Fig. 244.

EK106301

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.

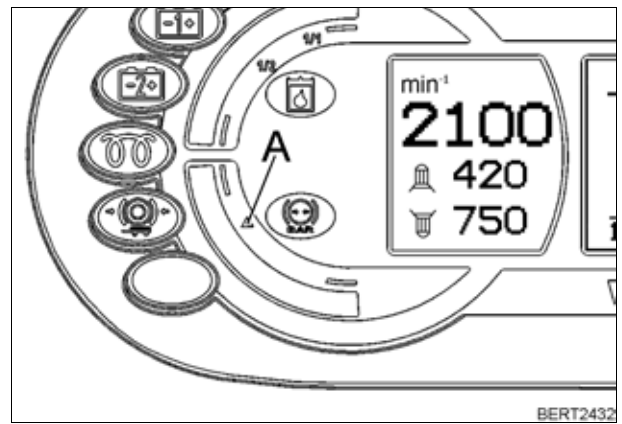


Fig. 245.

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)

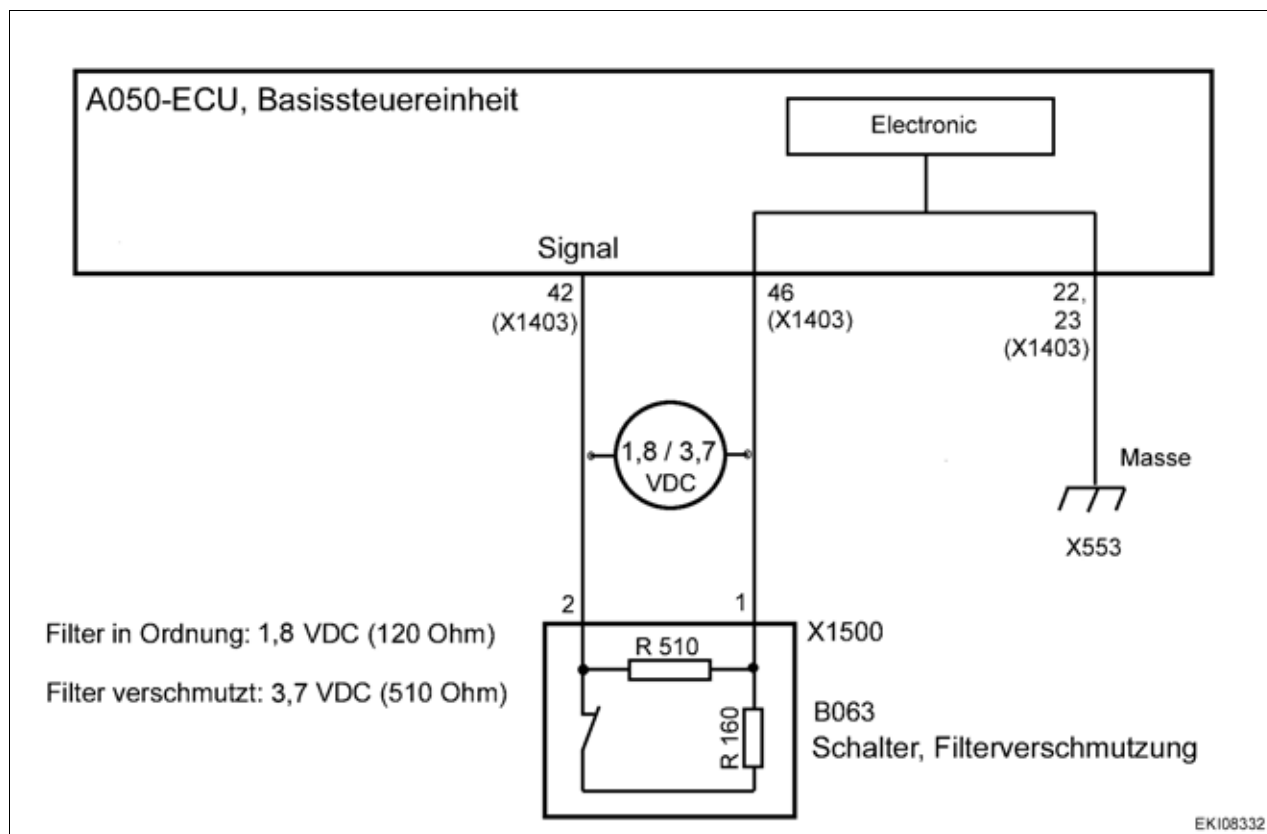


Fig. 246.

1001956

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.

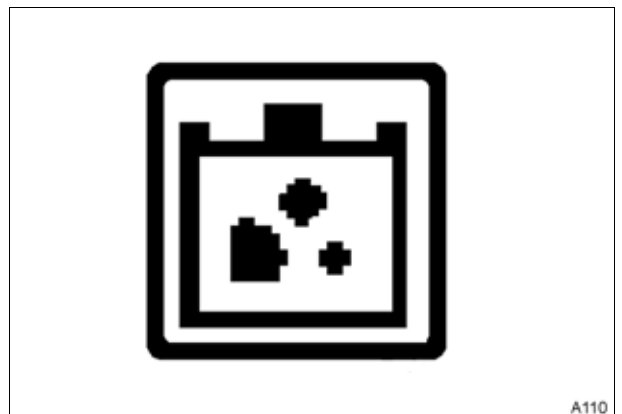


Fig. 248.

A110

I001964

Possible cause of fault

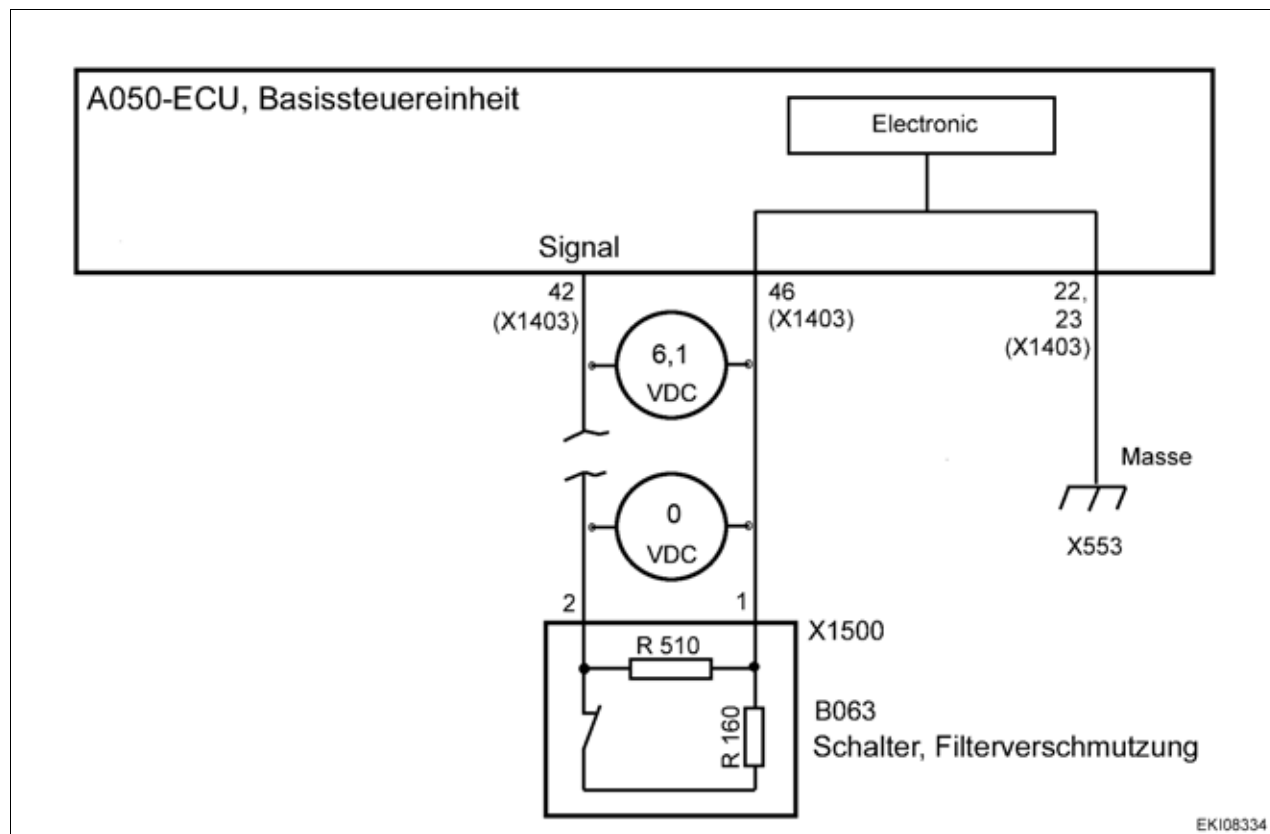


Fig. 249.

1001957

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

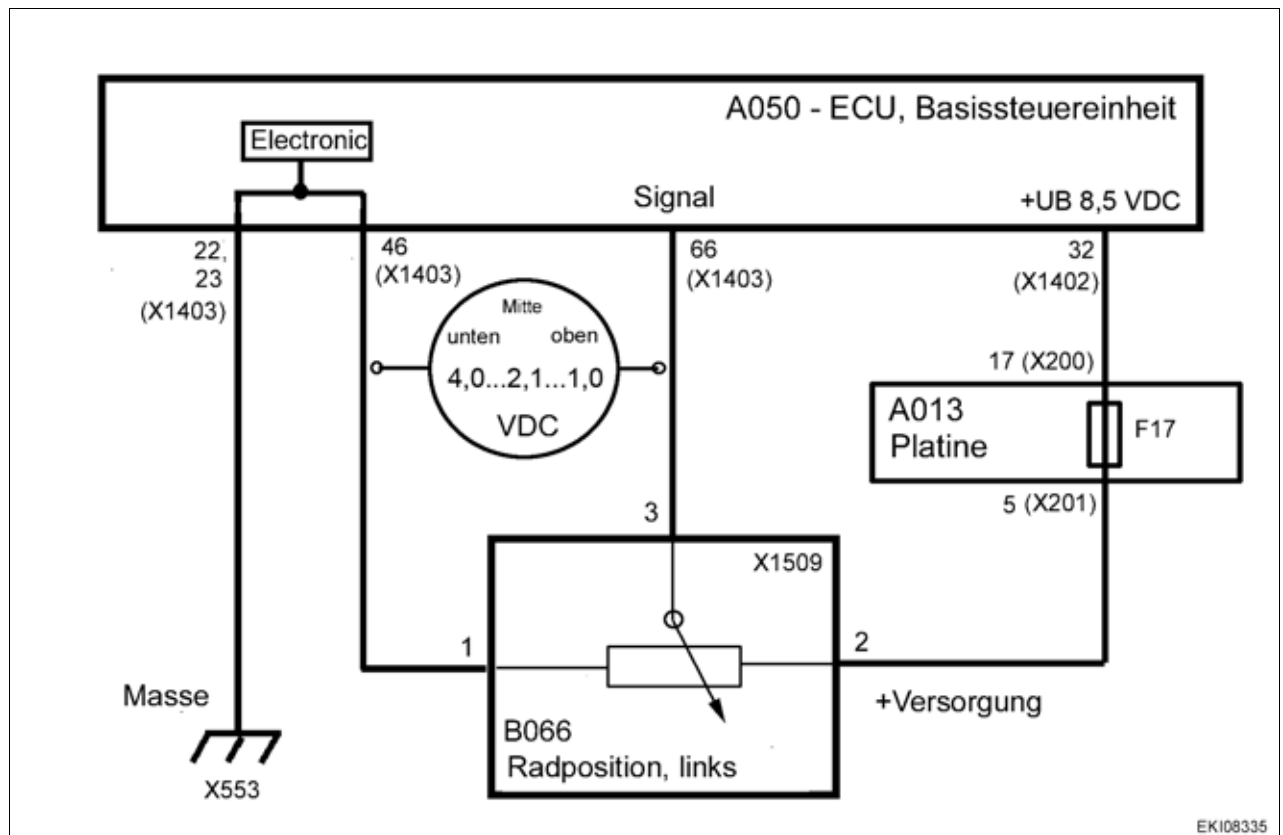


Fig. 250.

EKI08335

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

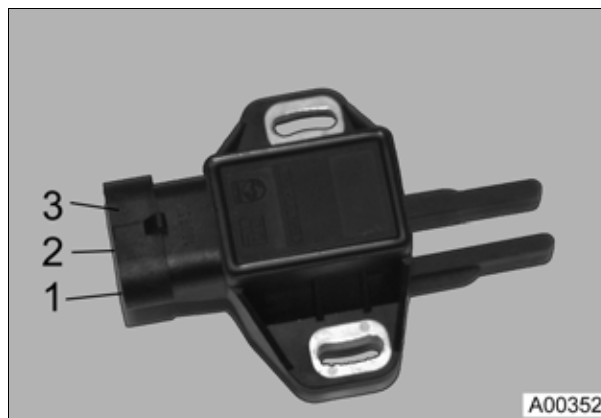


Fig. 251.

1001451

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.

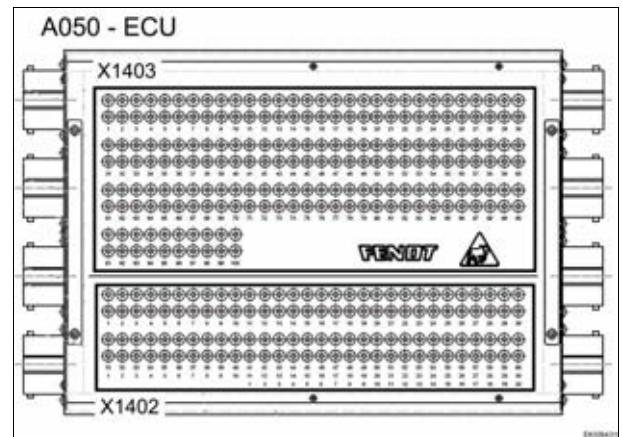


Fig. 252.

1001874



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

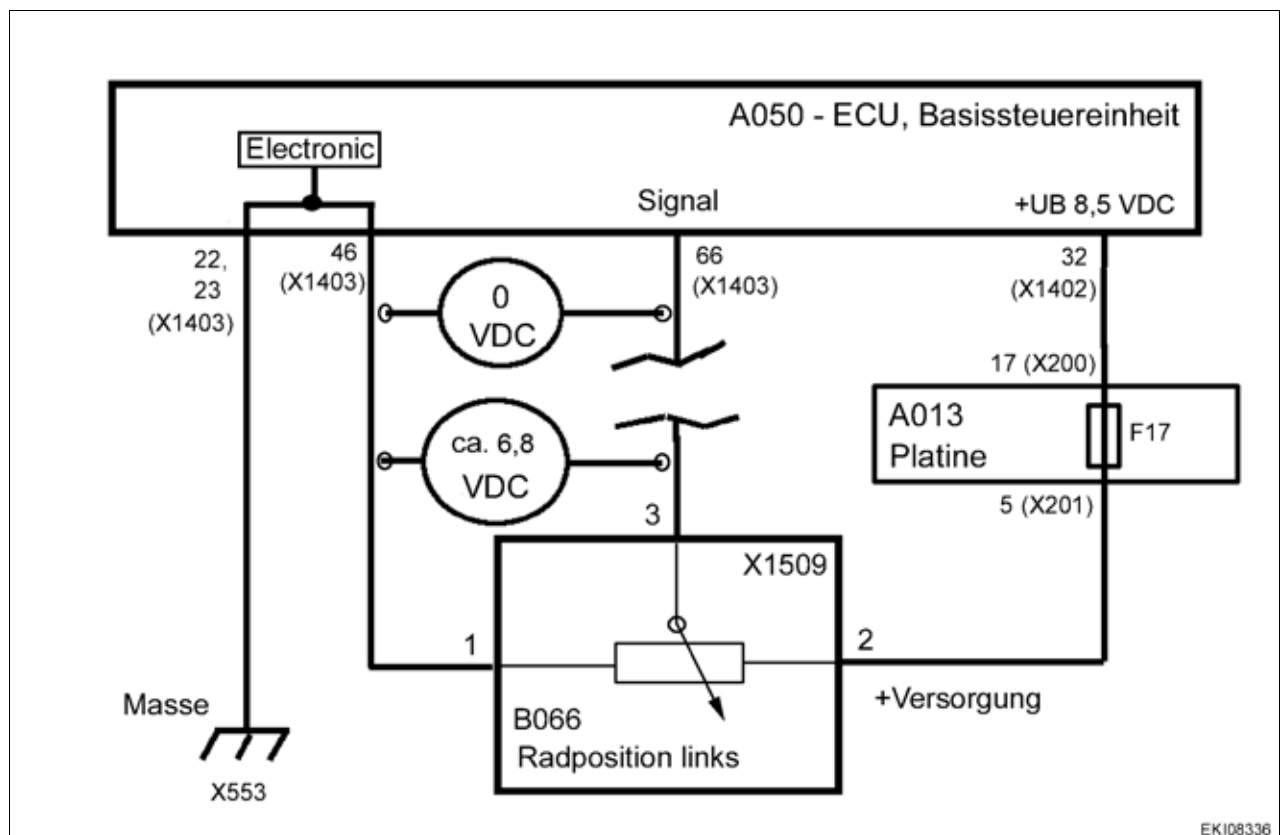


Fig. 253.

Eki08336

1001959

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)**

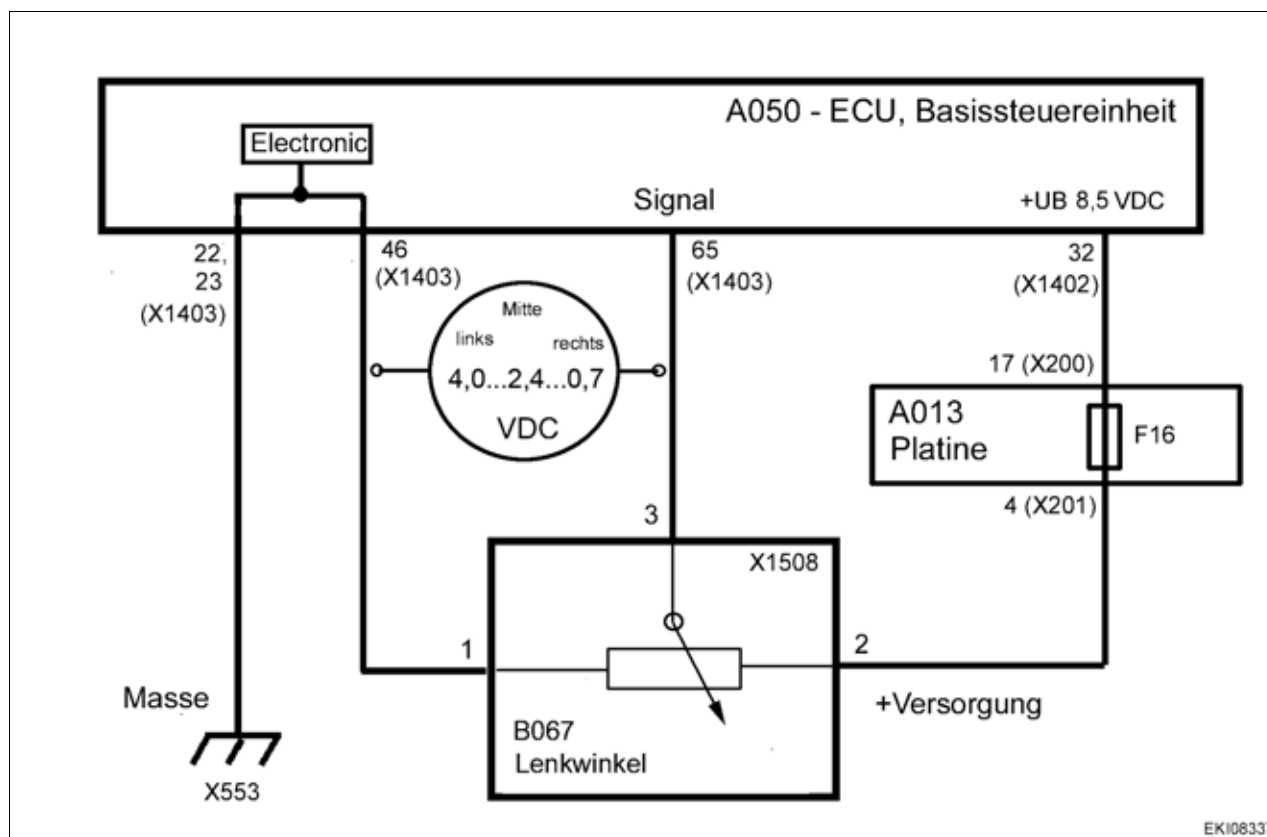


Fig. 254.

EKI08337

1001960

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

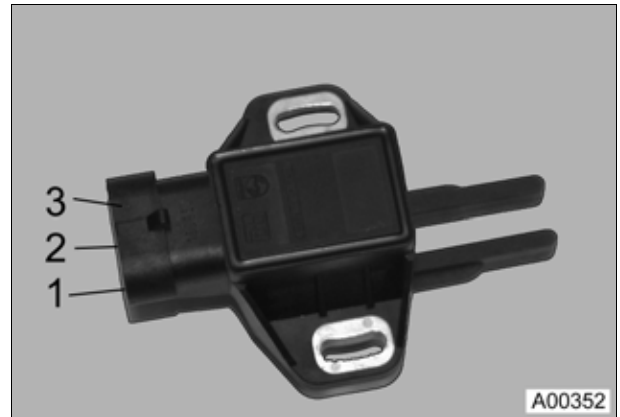


Fig. 255.

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.

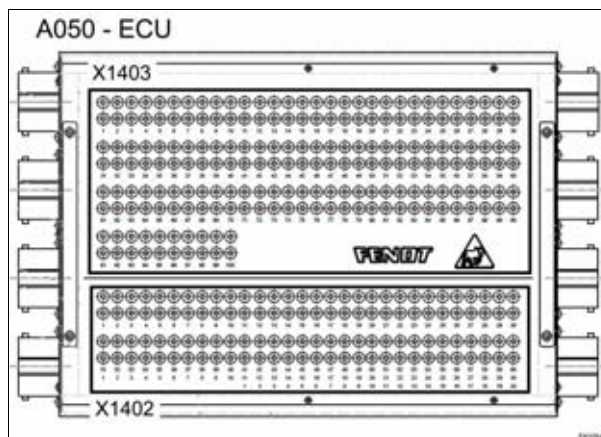


Fig. 256.

1001874

Possible cause of fault

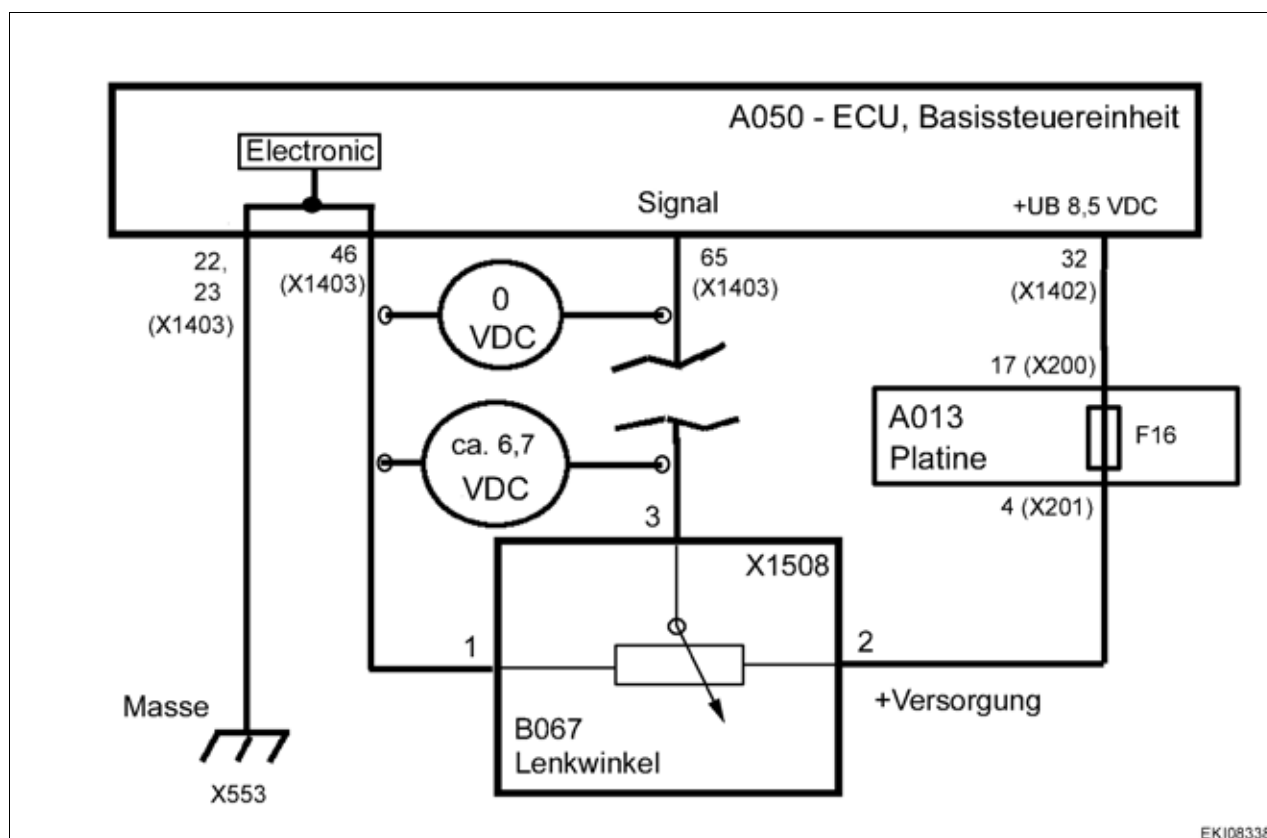


Fig. 257.

EK108338

1001961

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

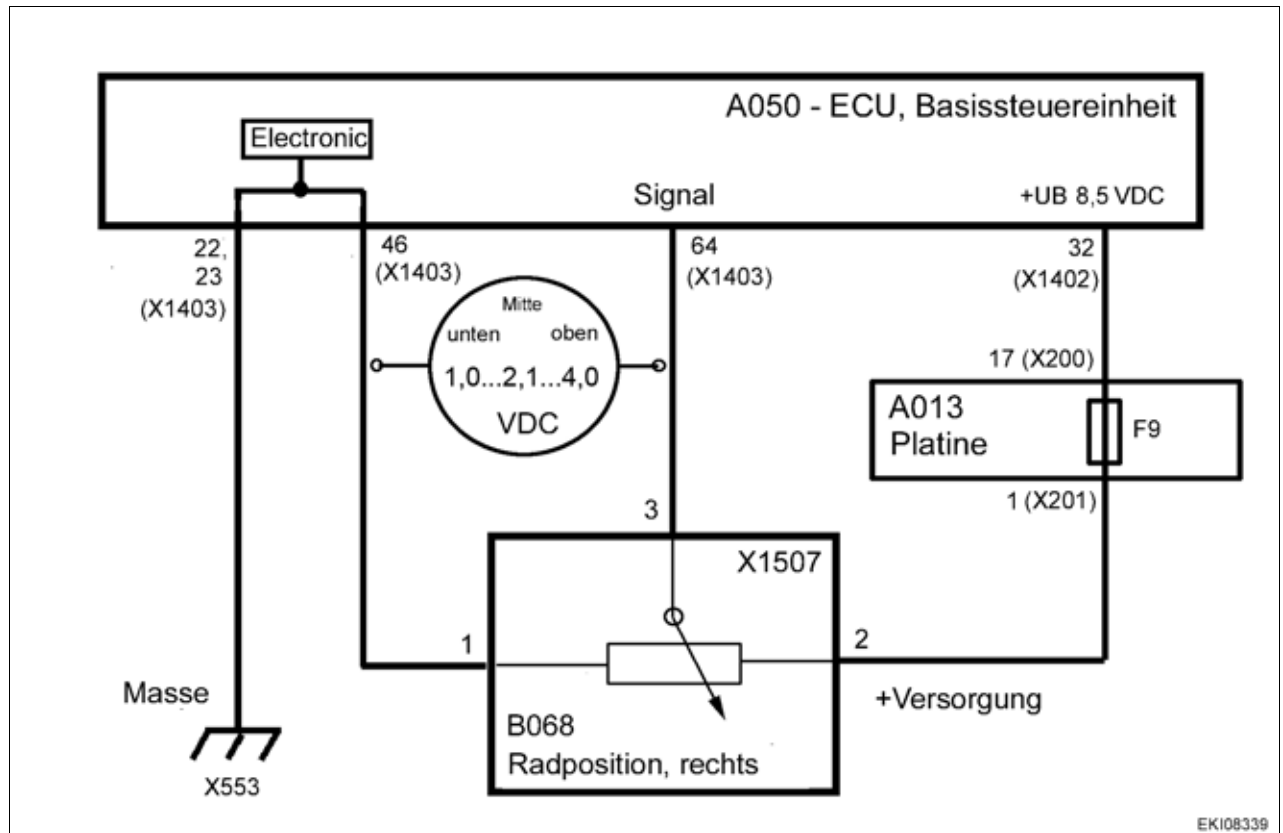


Fig. 258.

EKI08339

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

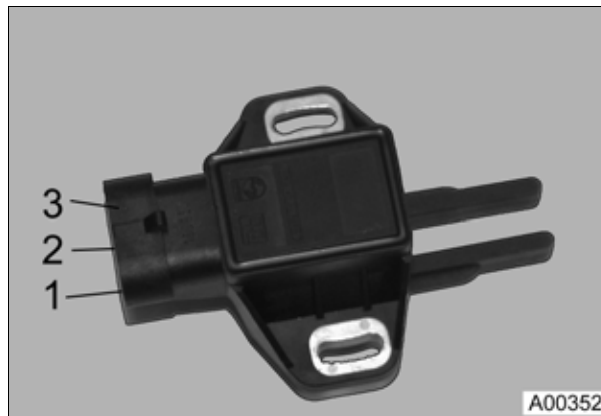


Fig. 259.

1001451

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.

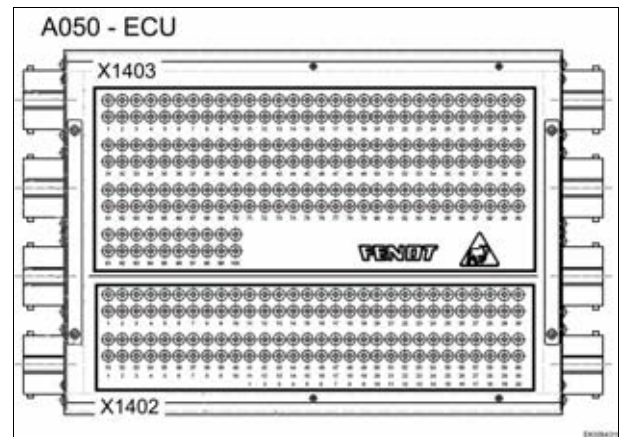


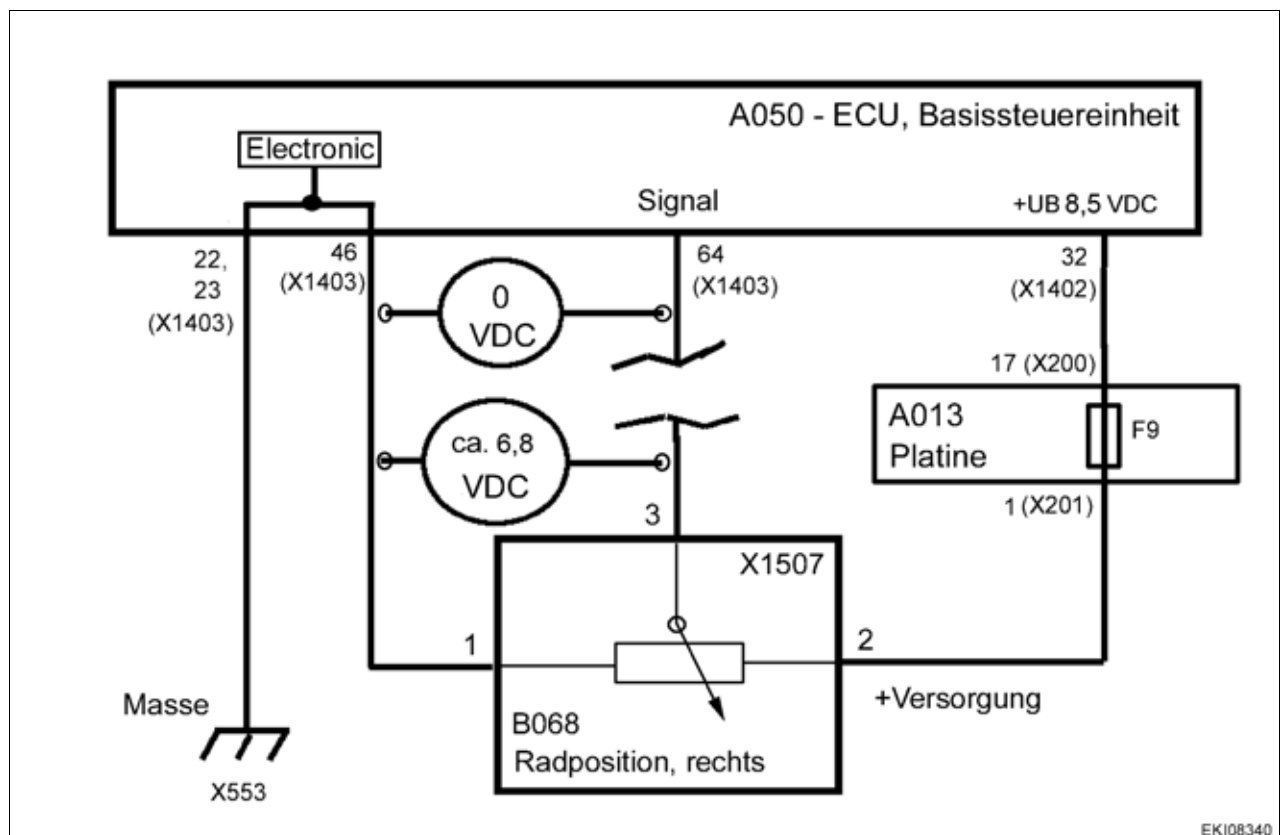
Fig. 260.

1001874



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



EKI08340

Fig. 261.

1001965

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



Fig. 262.

1001082

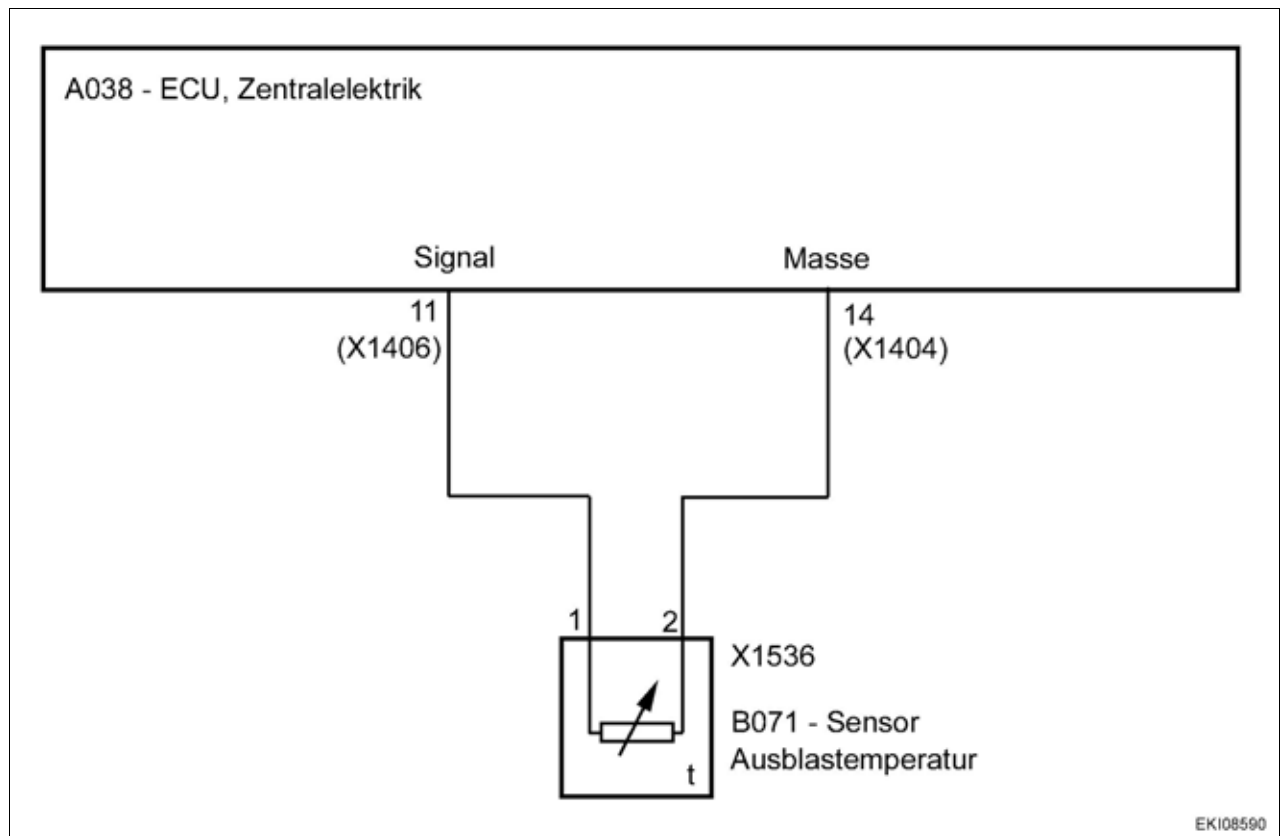
69 B071 output temperature sensor

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

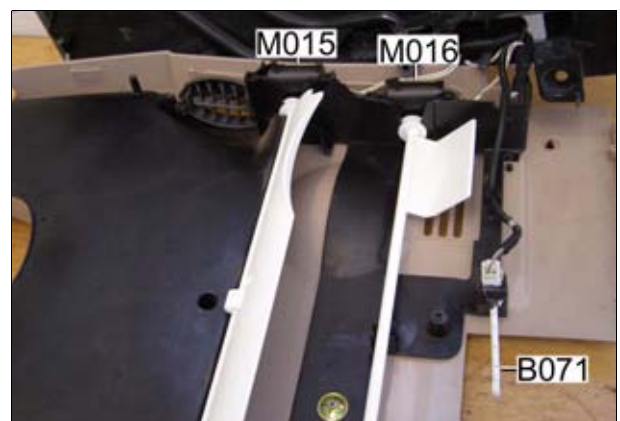


Fig. 264.

I001473

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-

T000793
Version 2
04-09-2009

293

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 component
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](#)

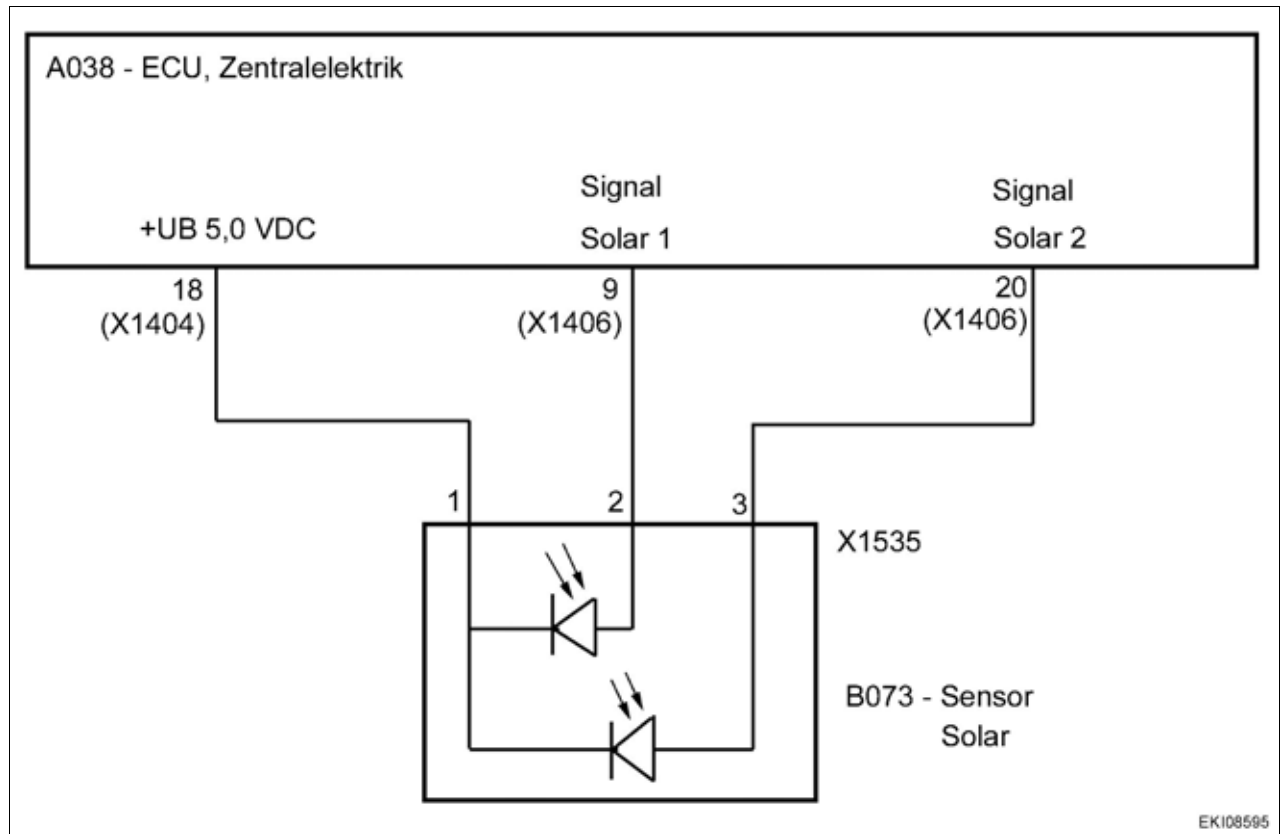
70 B073 sensor, solar (heat insolation)

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.

1001083

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 component
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

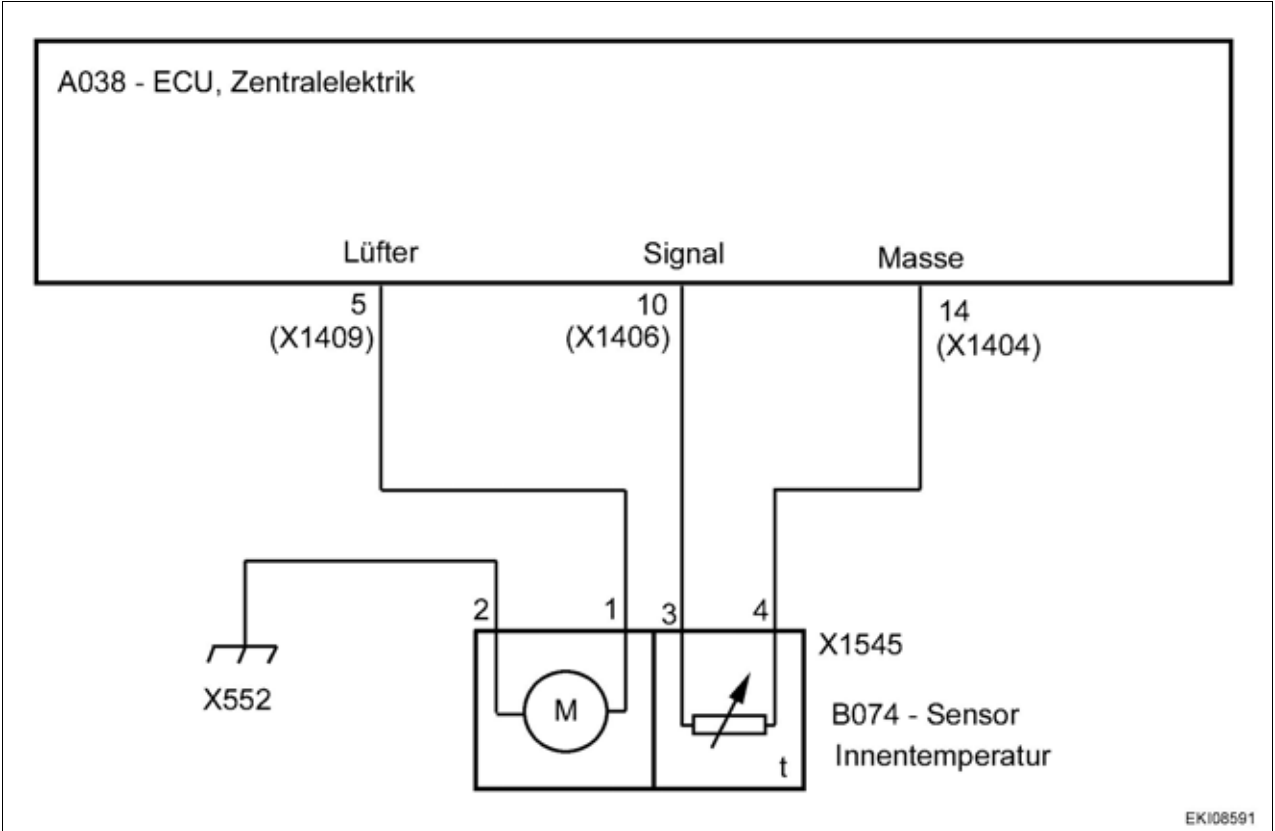


Fig. 267. I002382

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

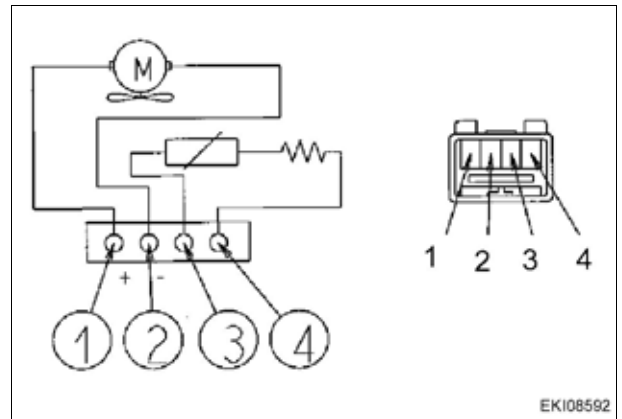


Fig. 268.

EK108592
1002383

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 component
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](#)

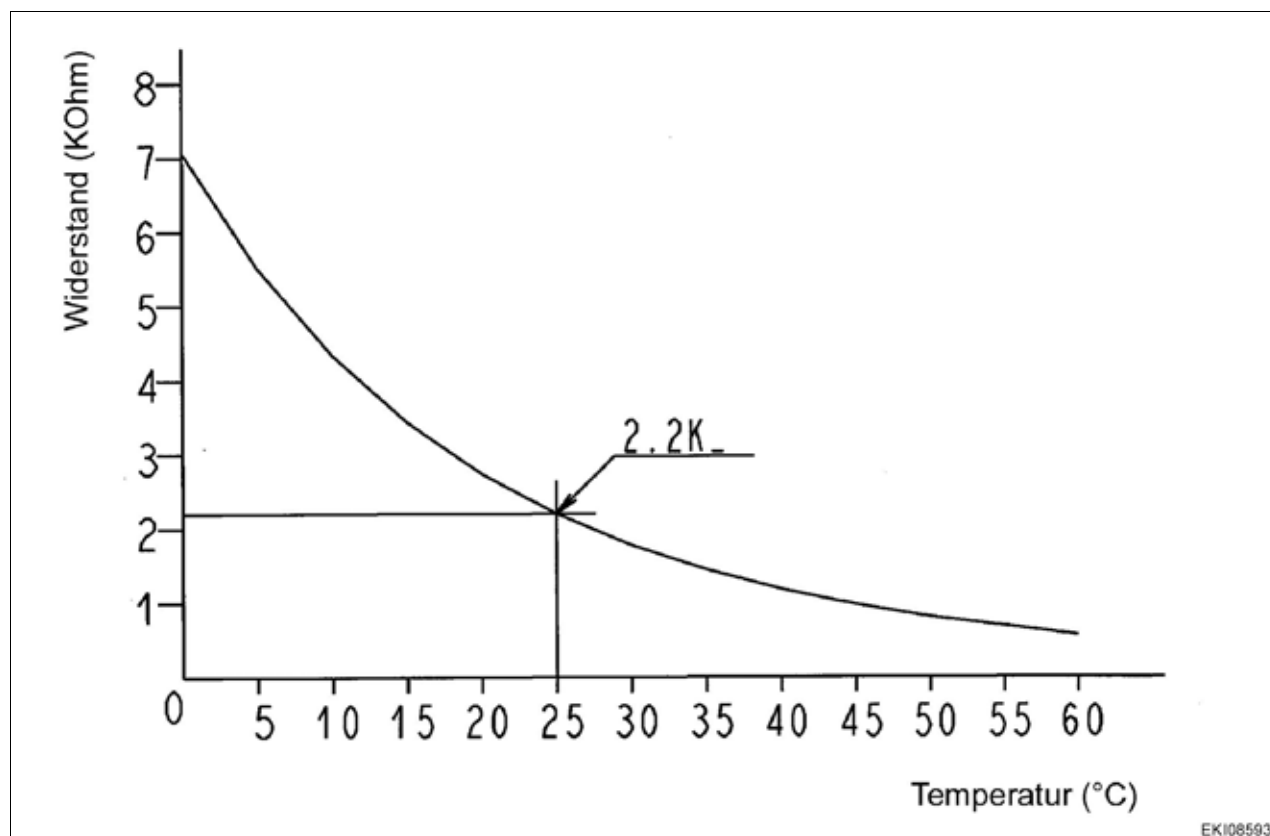


Fig. 269.

EKI08593

I002384

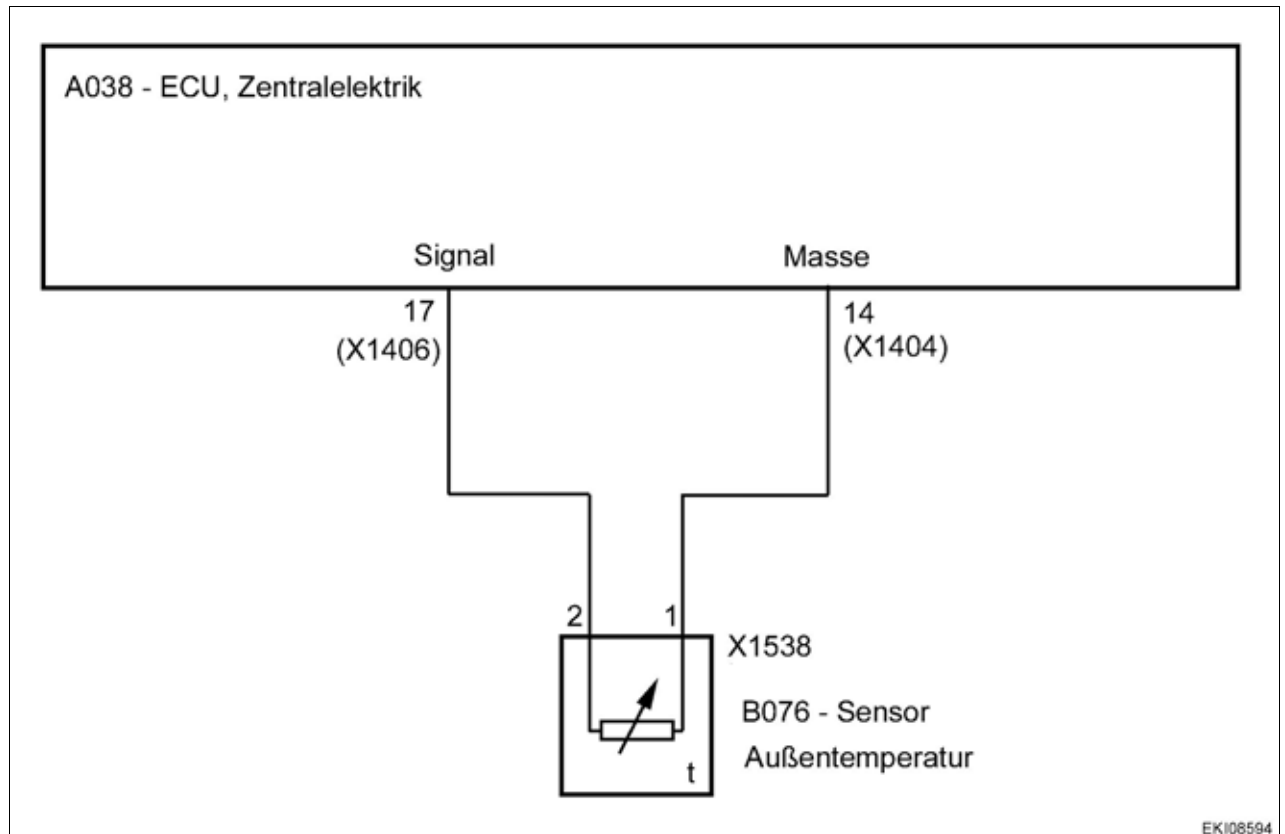
72 B076 exterior temperature sensor

Fig. 270.

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 component
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](#)

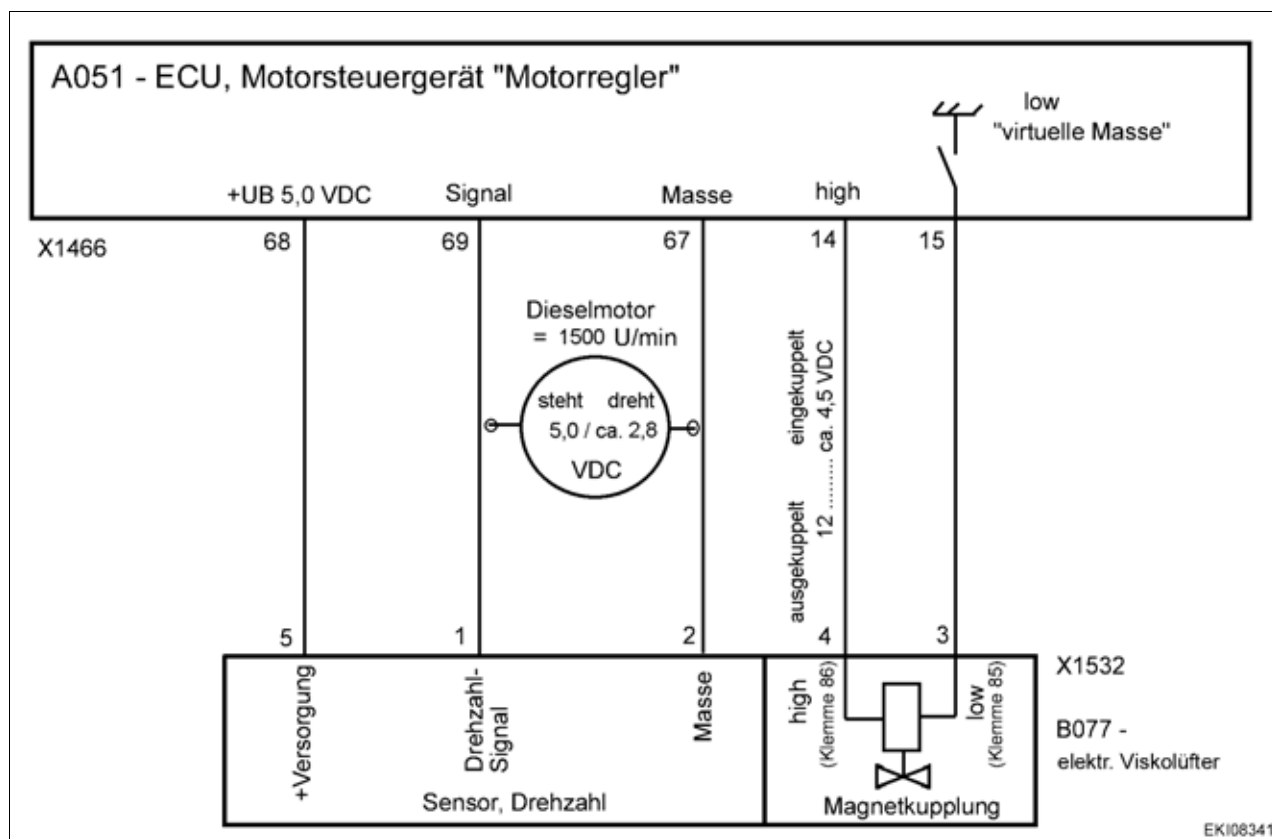
73 B077 control, engine fan (speed sensor/magnetic clutch)**NOTE:** see §2

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)

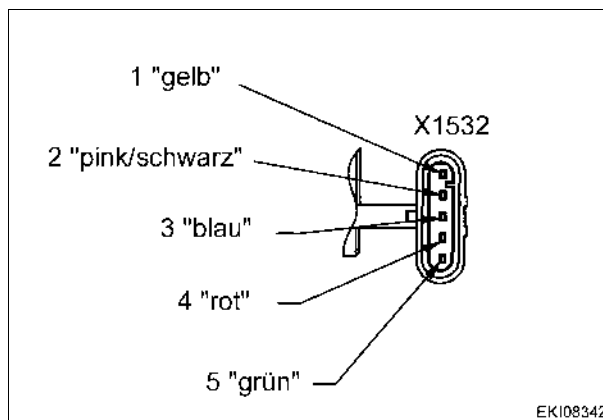


Fig. 273.

EKI08342
1001542

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.

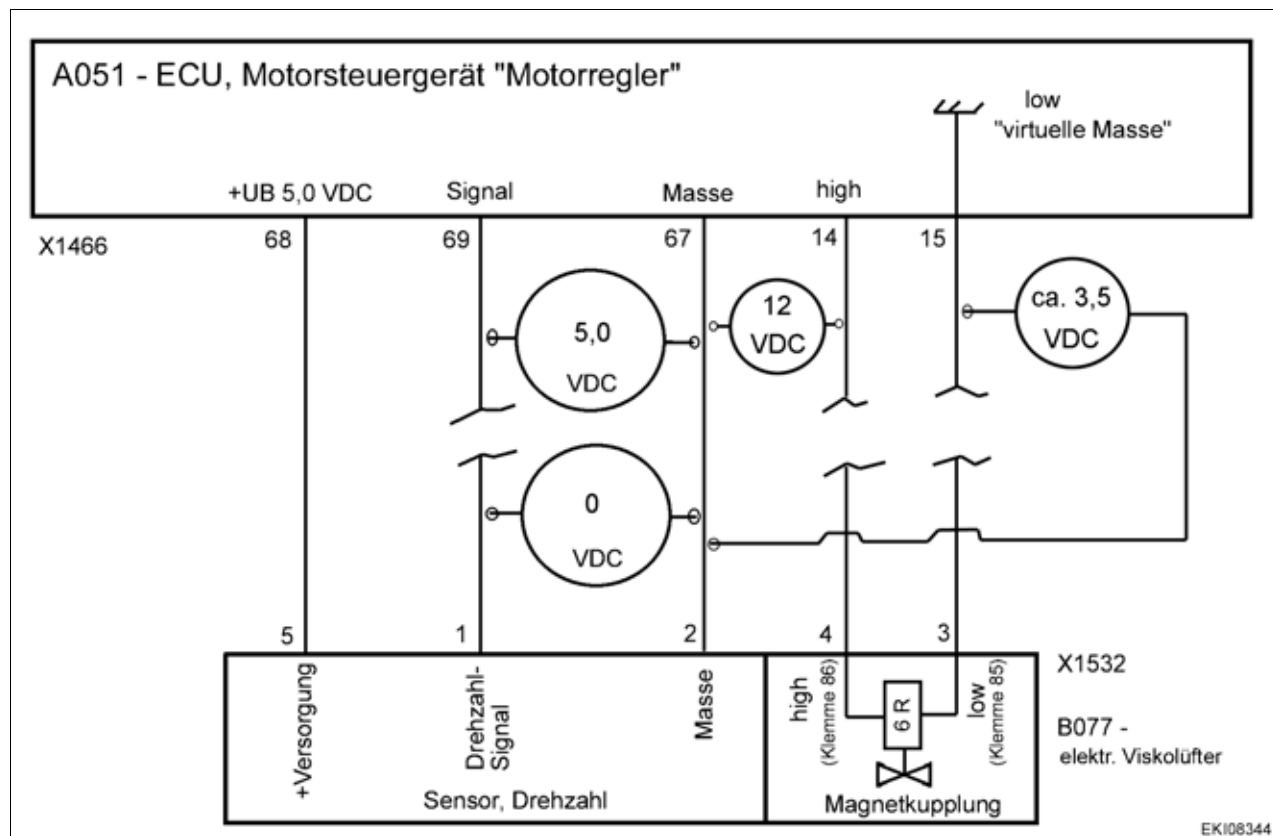
All readings +/- 10%.

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



EKI08344

Fig. 274.

I002040

74 B081 steering wheel sensor (360°)

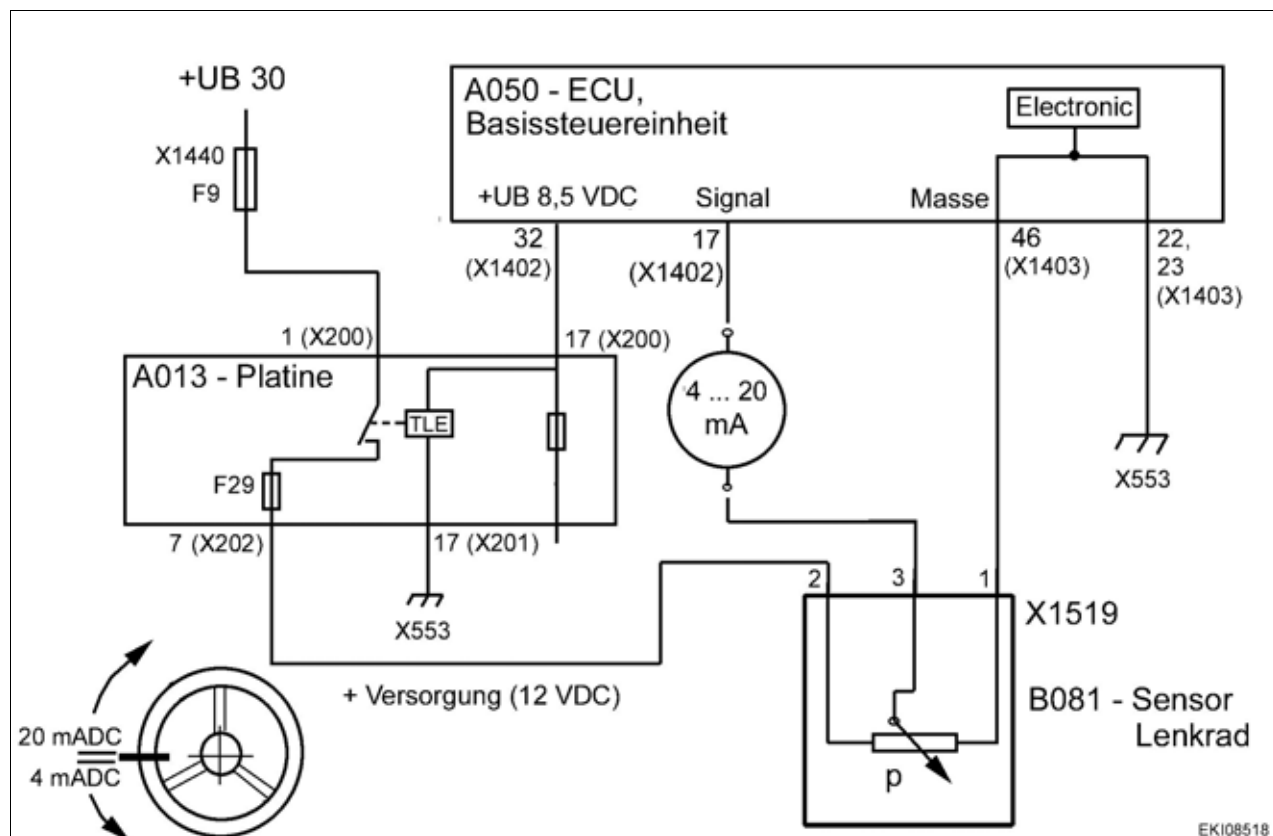


Fig. 275.

EK108518

1002335

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.

EKI09490
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.

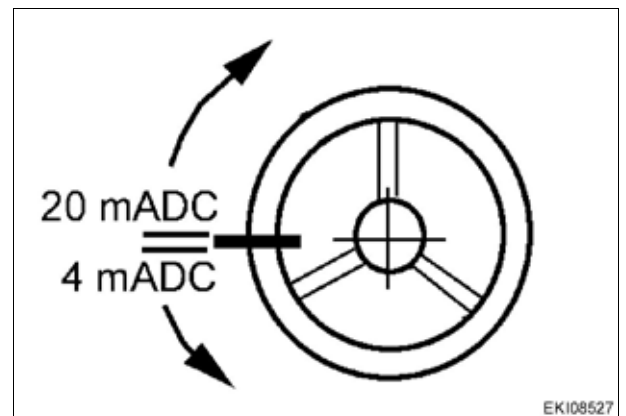


Fig. 277.

EKI08527
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

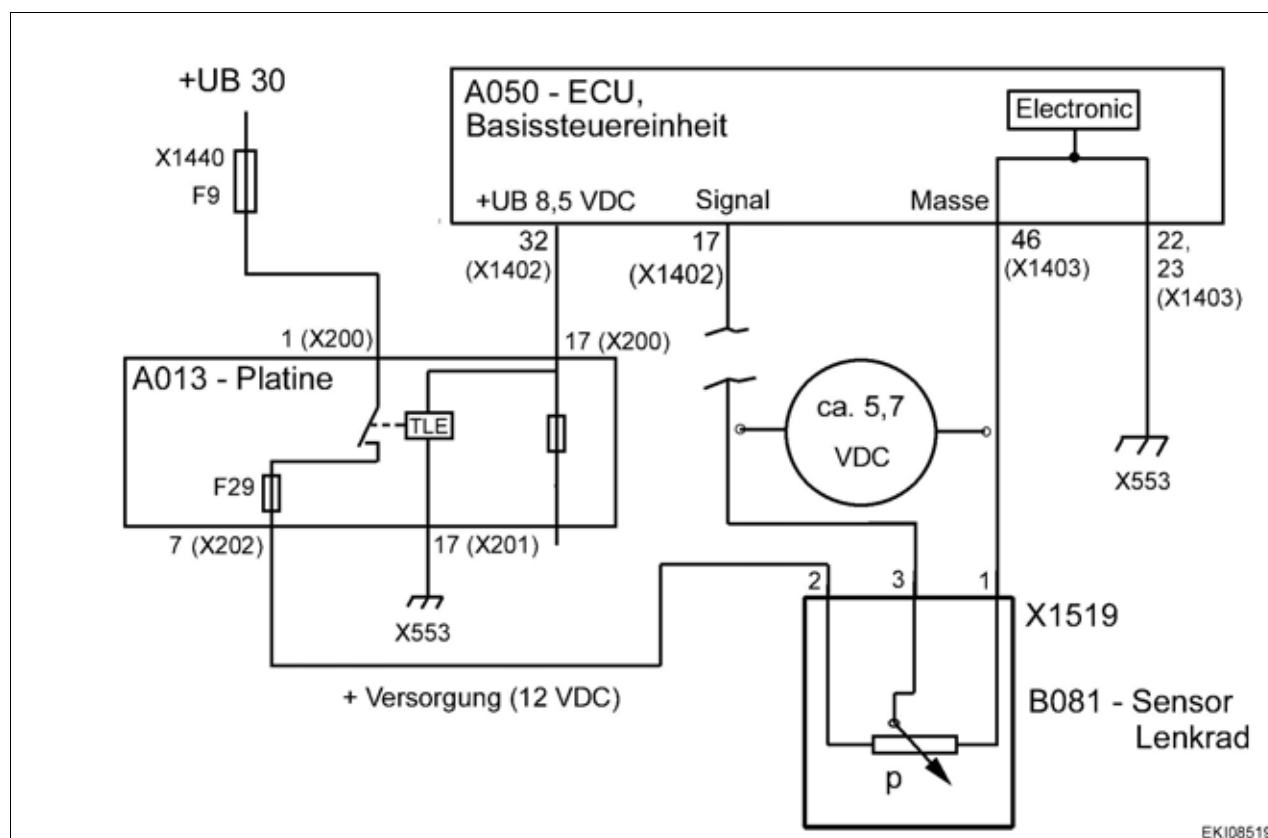


Fig. 278.

EKID8519

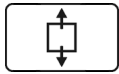
1002338

75 B083 immobiliser control unit**B083 immobiliser control unit**

X1494 separation point at B083



On left of steering column.



Remove left panel.

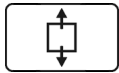


Fig. 279.

I001999

U001 aerial

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

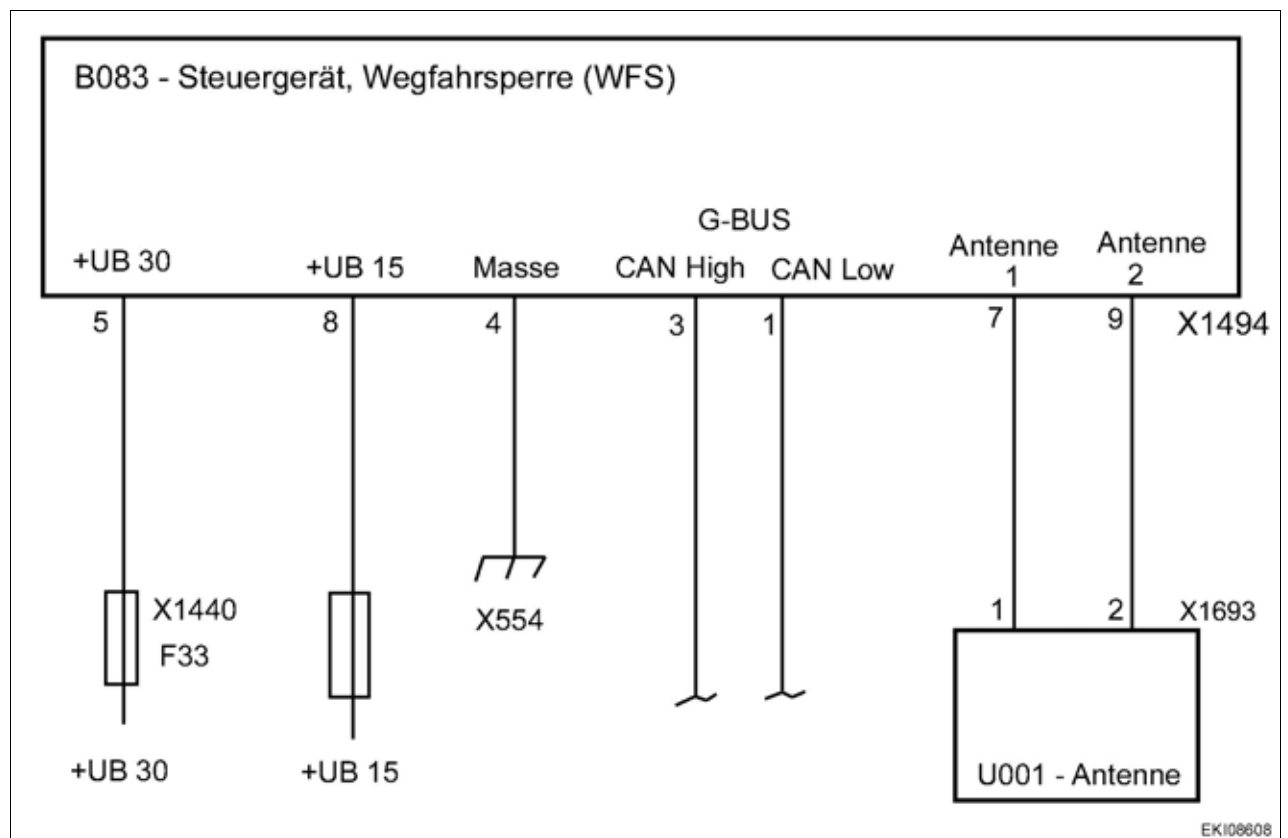


Remove right panel.



Fig. 280.

I002006



EKI06608

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

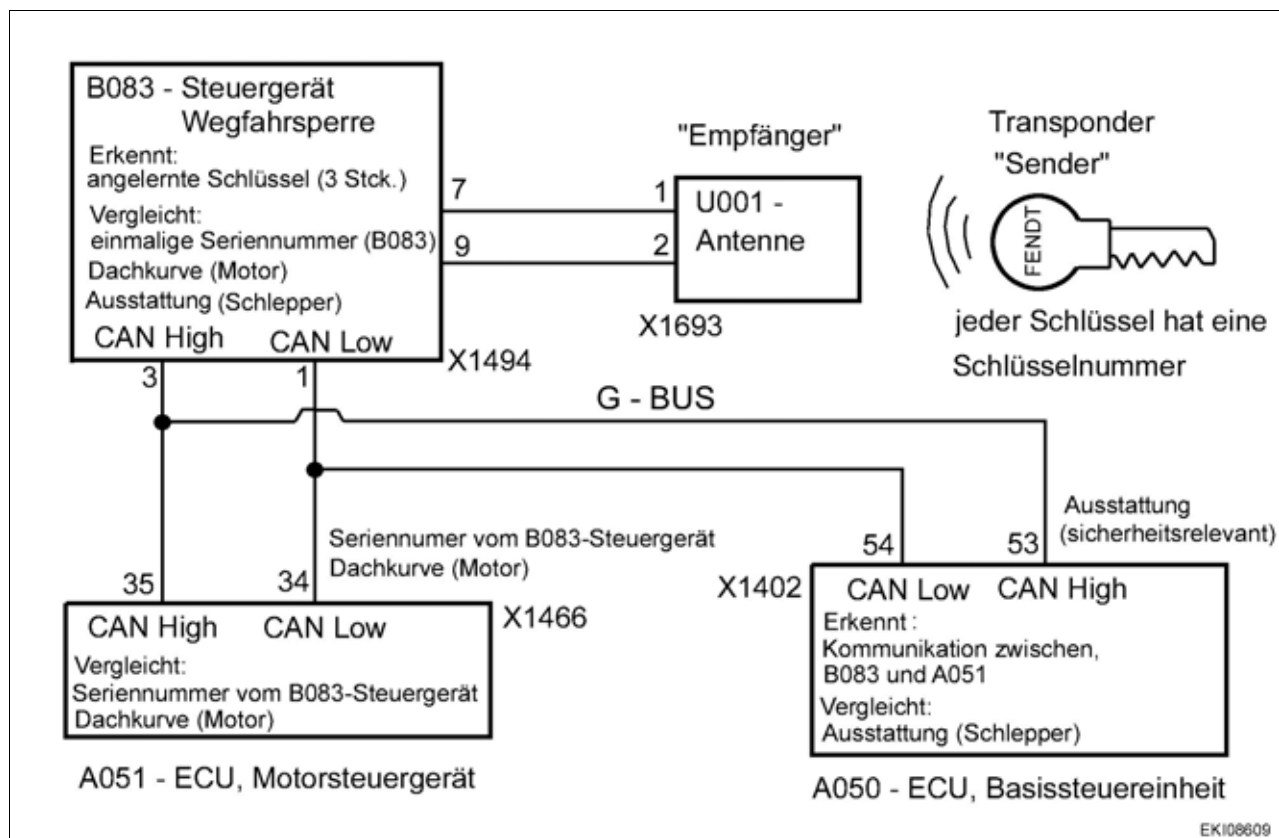


Fig. 282.

1002411

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

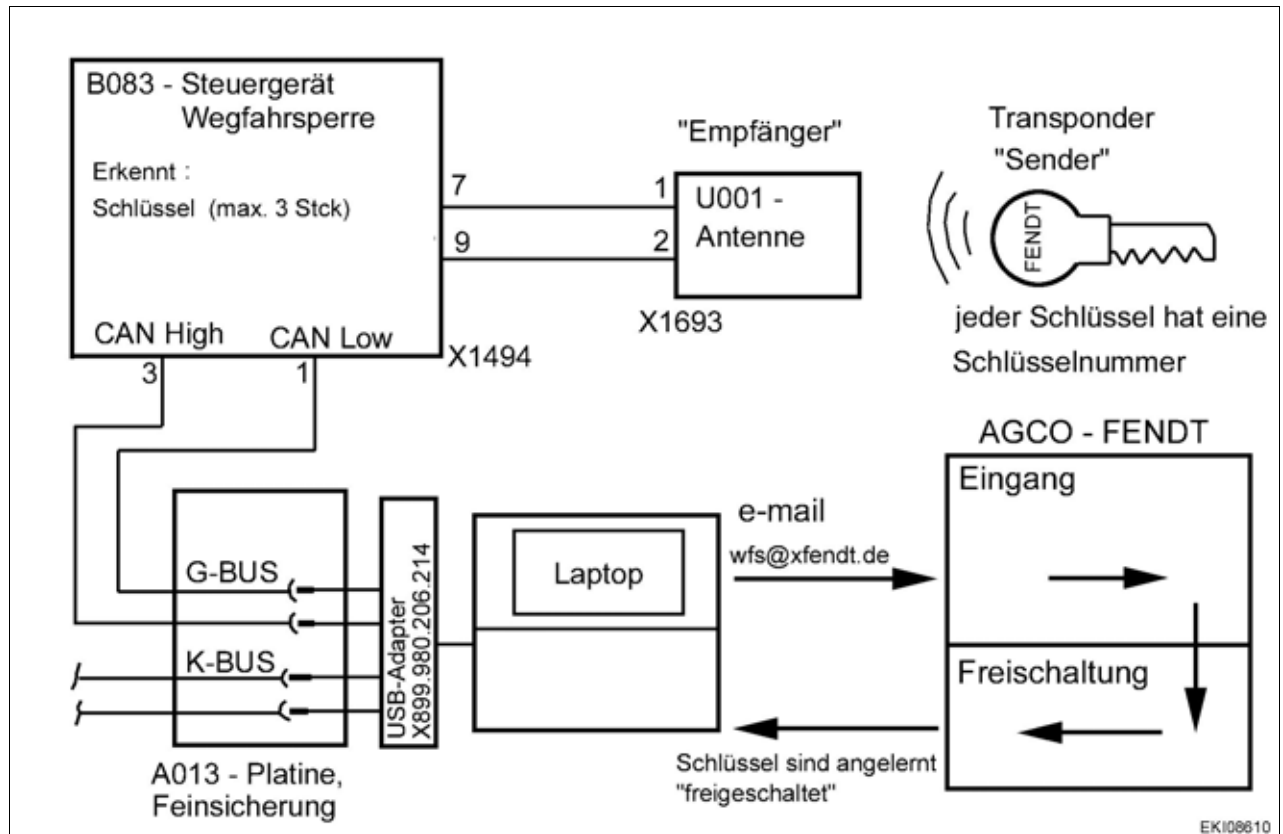


Fig. 283.

EKI08610

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).

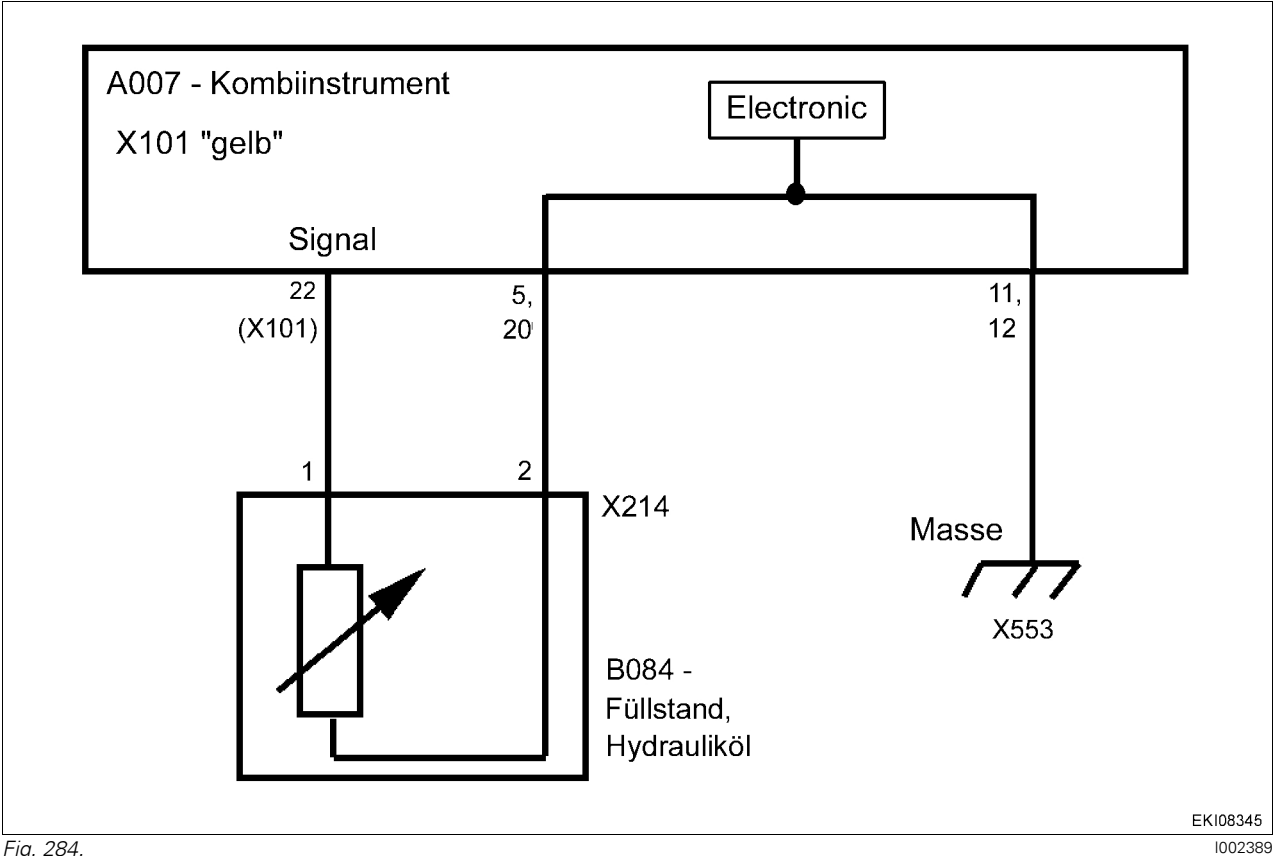
The teaching process (main items):

- 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



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

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.

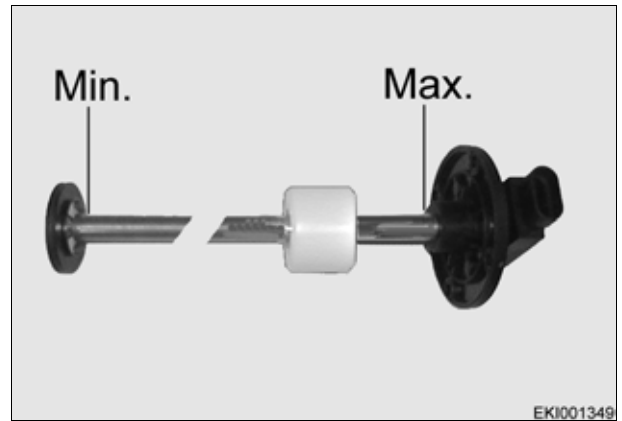


Fig. 285.

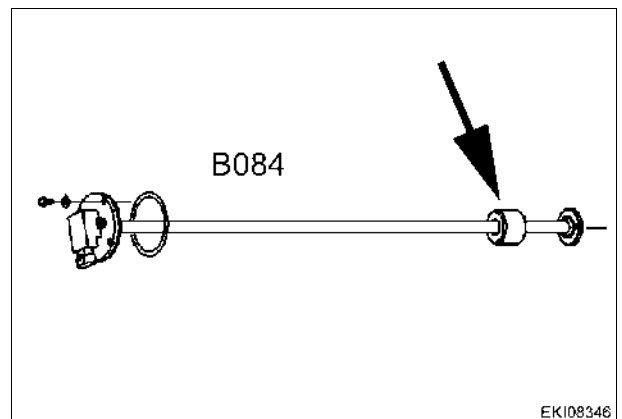
EKI001349
I001509

Fig. 286.

EKI08346
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

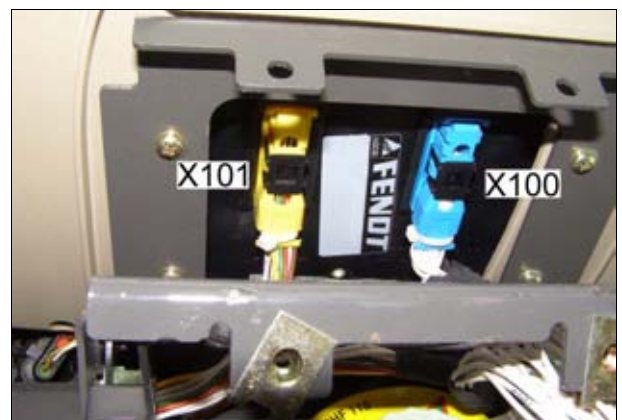


Fig. 287.

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.

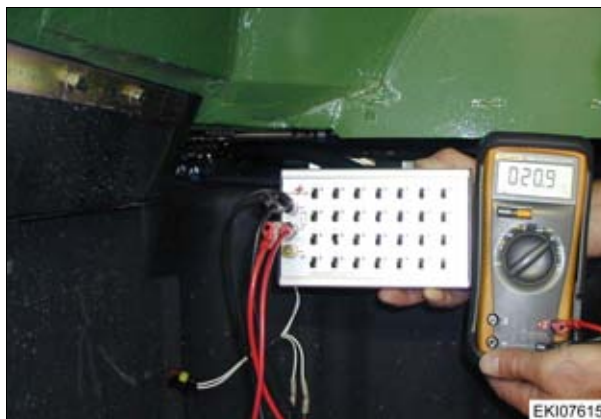


Fig. 288.

1001514

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.

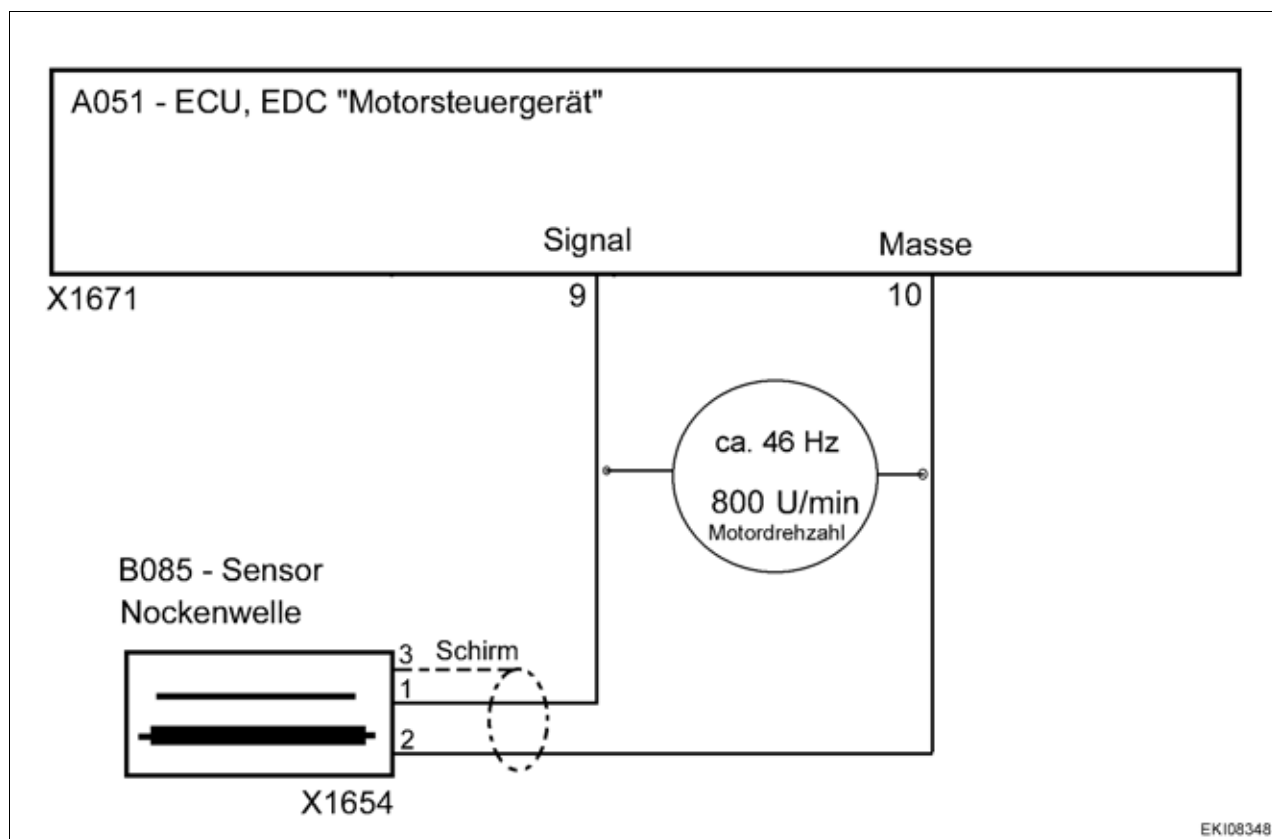
77 B085 sensor, camshaft speed**NOTE:** see §6

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.

1001548

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.

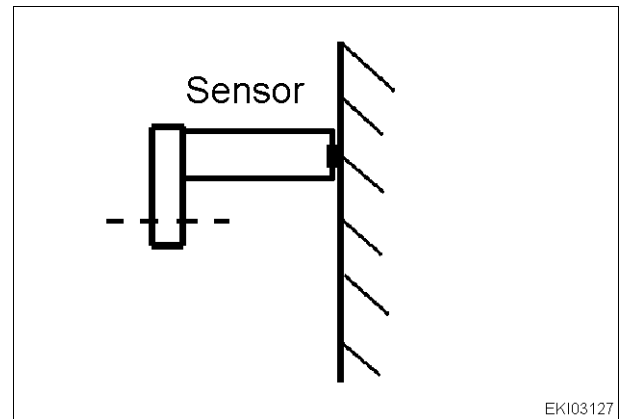


Fig. 291.

EKI03127

I001546

Possible cause of fault

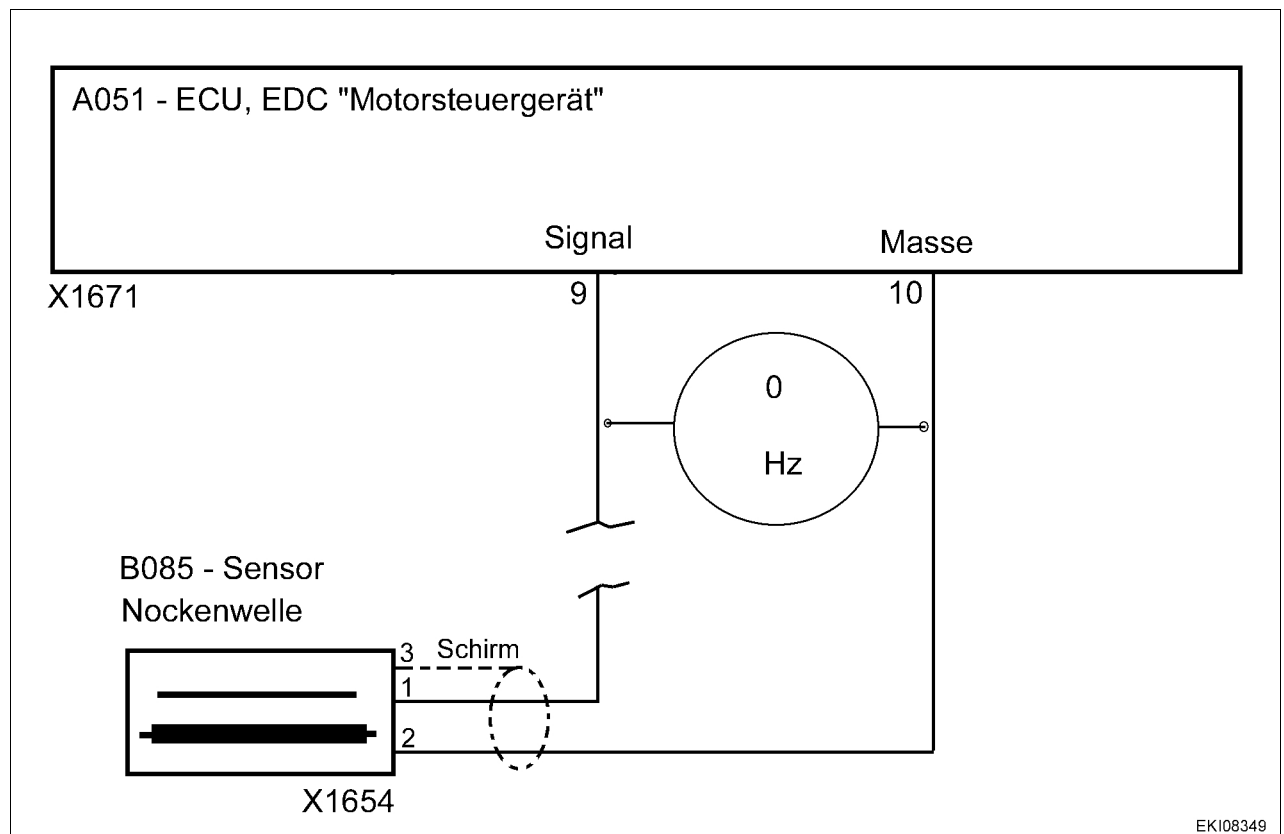


Fig. 292.

EKI08349

I002043

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

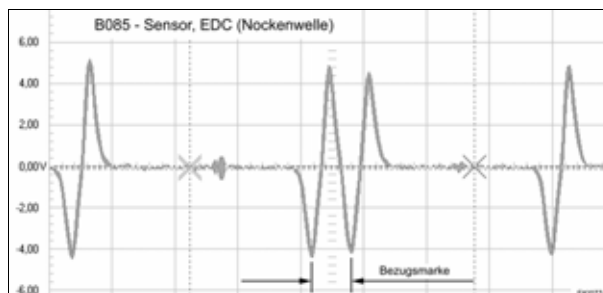


Fig. 293.

1001549

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

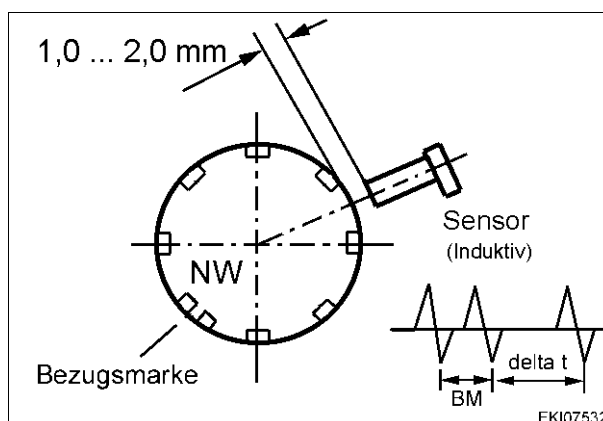


Fig. 294.

1001550

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.

NOTE: Working cycle (4-stroke engine)

2 crankshaft revolutions

1 camshaft revolution

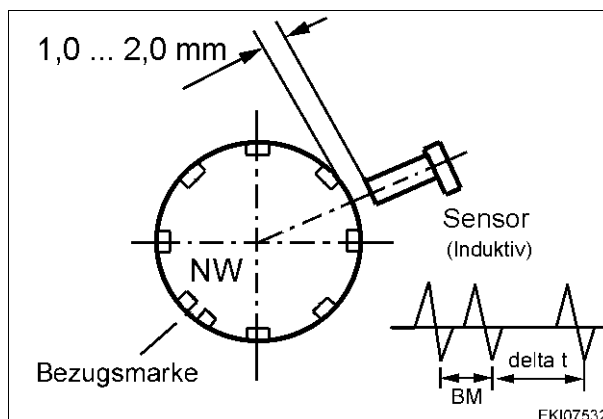
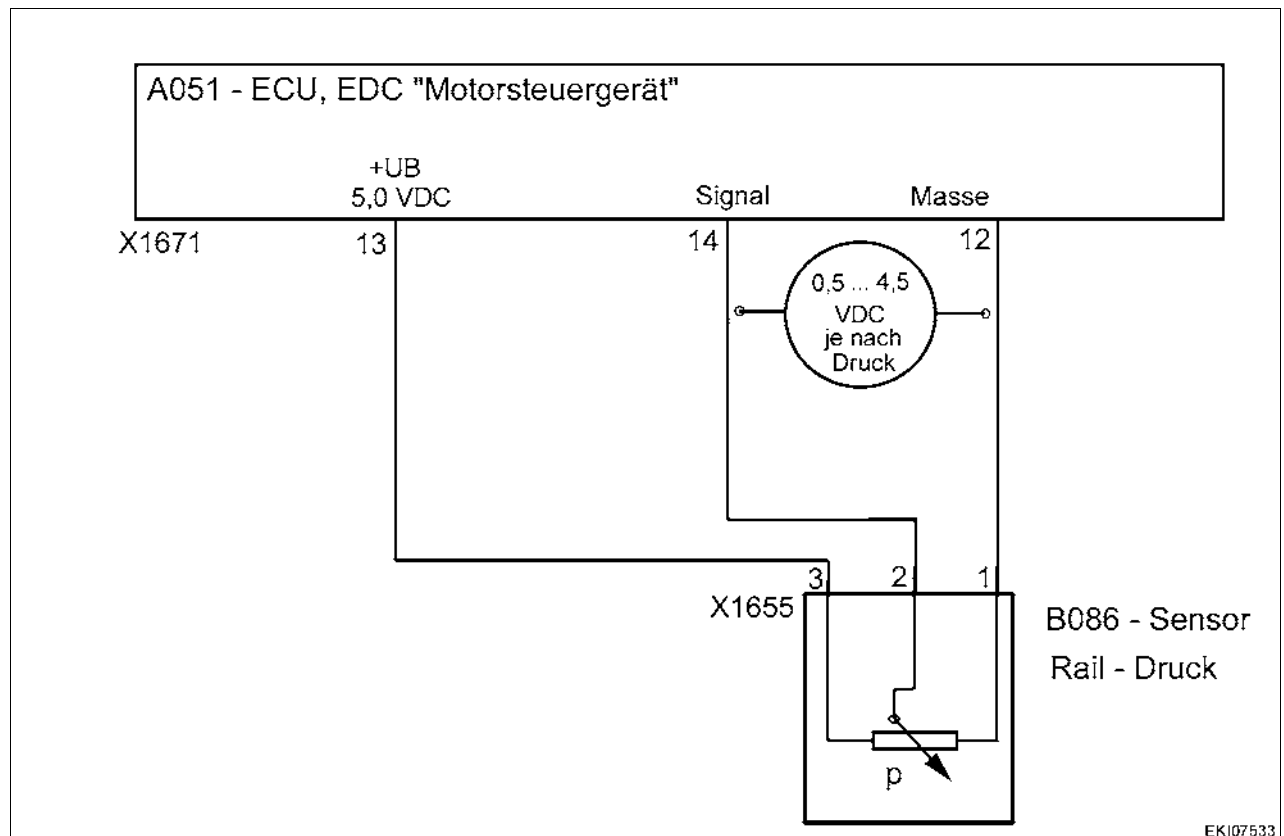


Fig. 295.

1001551

78 B086 rail pressure sensor

EKI07533

I001555

Fig. 296.

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.

1001086

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

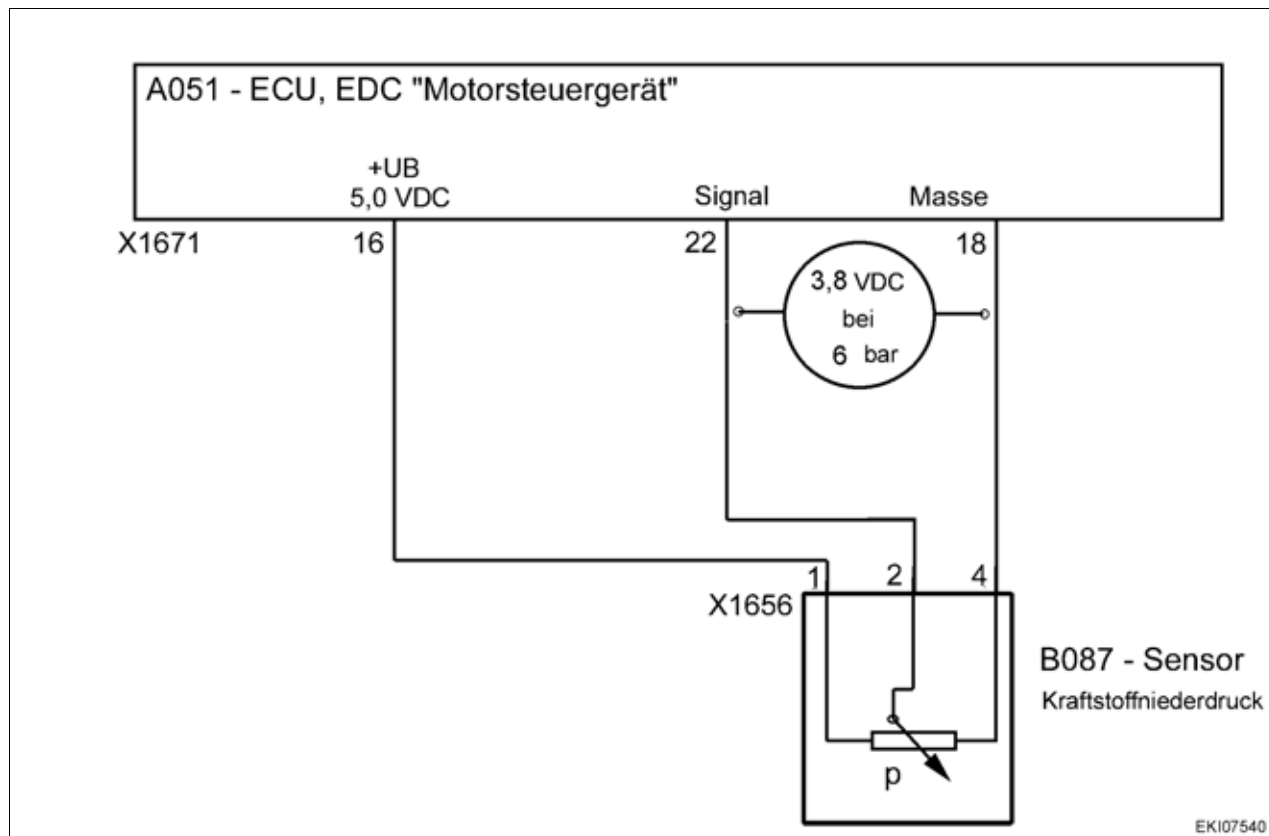


Fig. 298.

1002045

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](#)

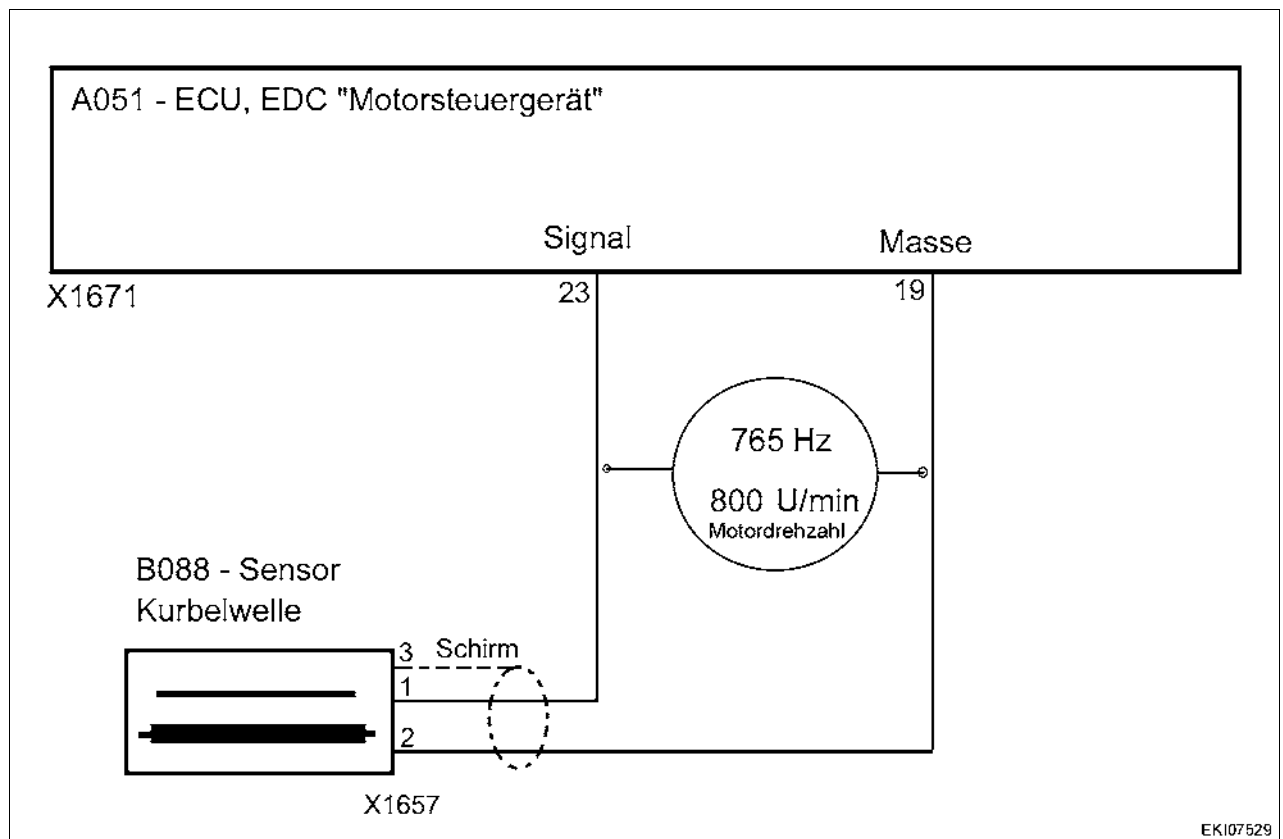
80 B088 sensor, crankshaft speed**NOTE:** see §9

Fig. 300.

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.

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

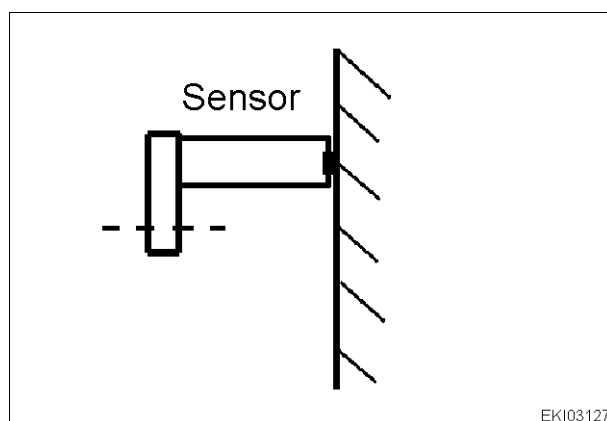
see §9

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.

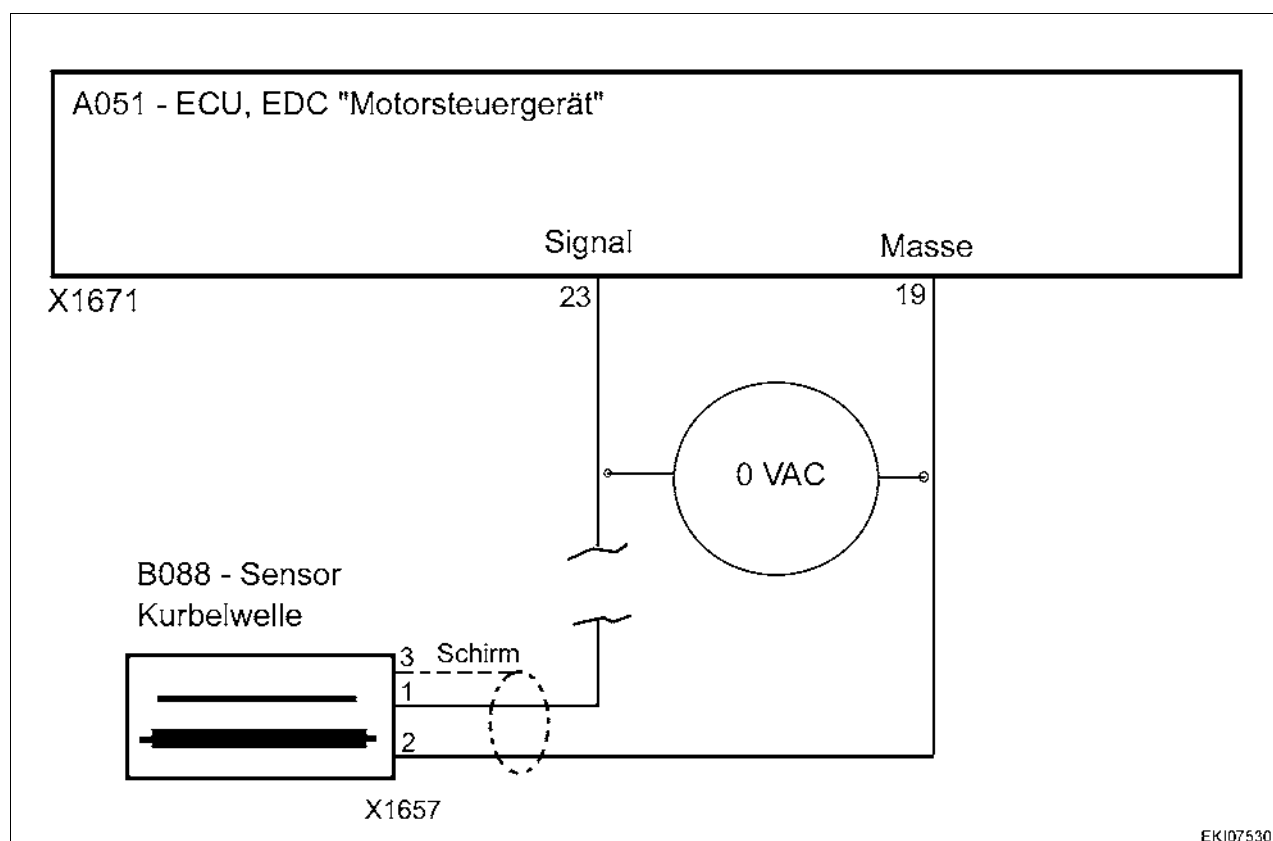


EKI03127

Fig. 302.

I001546

Possible cause of fault



EKI07530

Fig. 303.

I001599

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

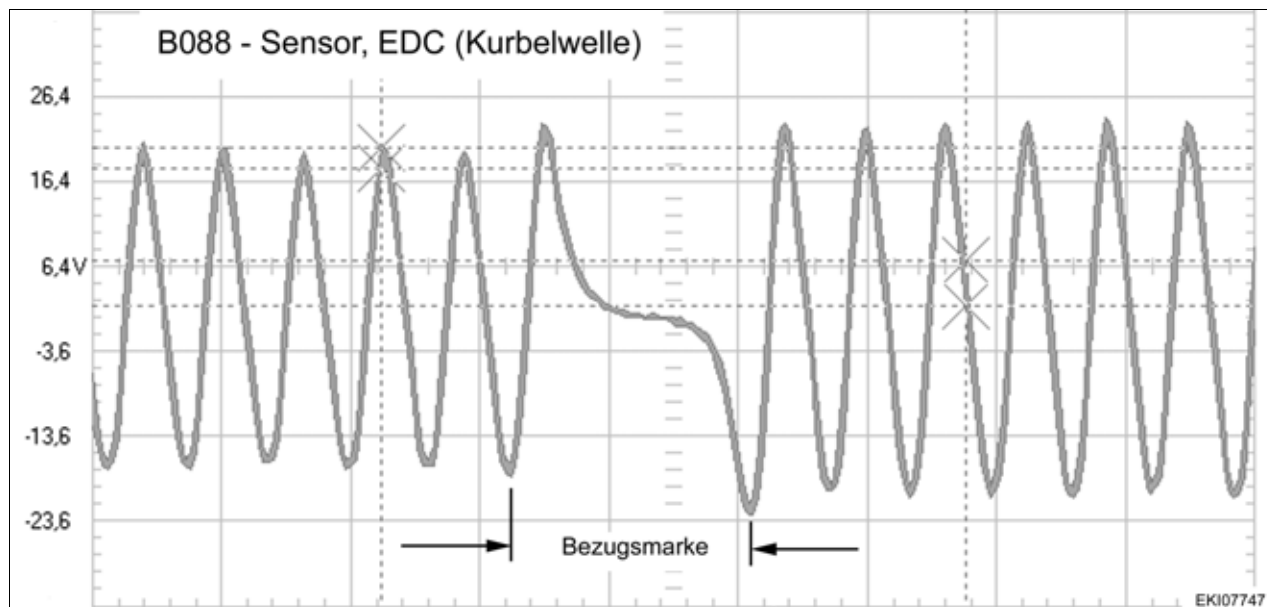


Fig. 304.

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

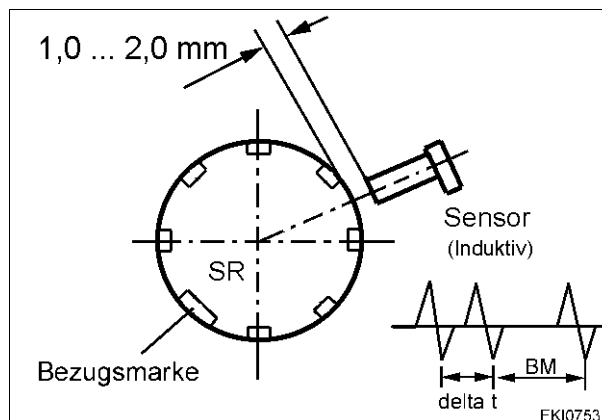


Fig. 305.

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

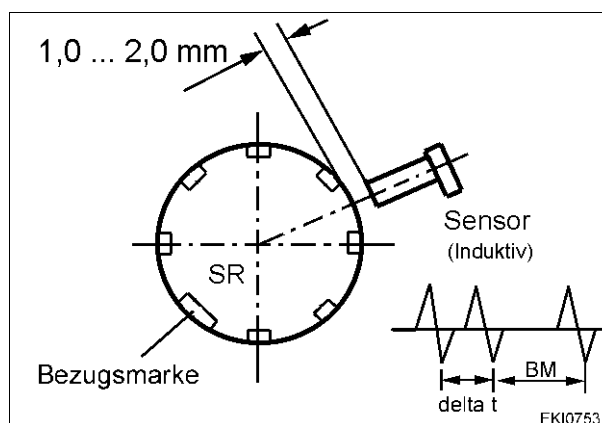


Fig. 306.

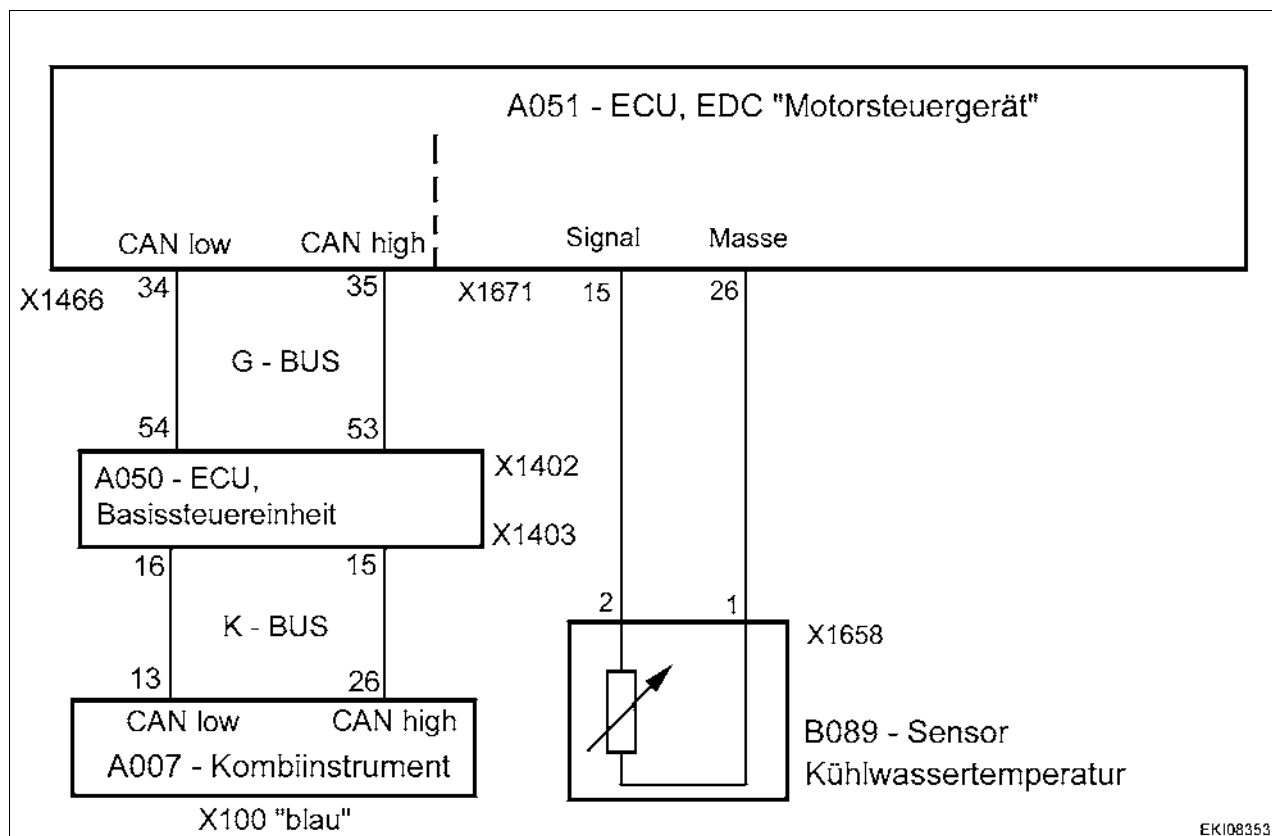
81 B089 coolant temperature sensor

Fig. 307.

EKI08353

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

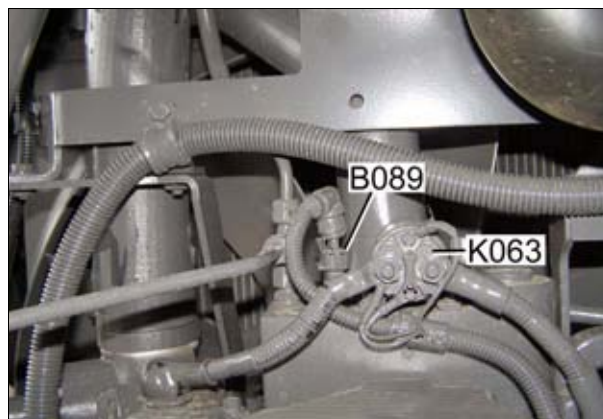


Fig. 308.

1001088

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

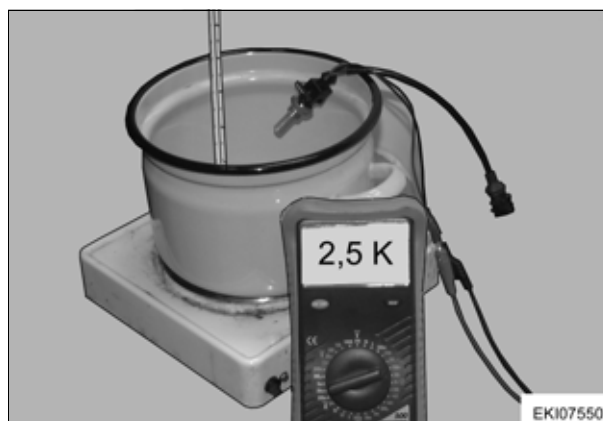


Fig. 309.

1001605

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.

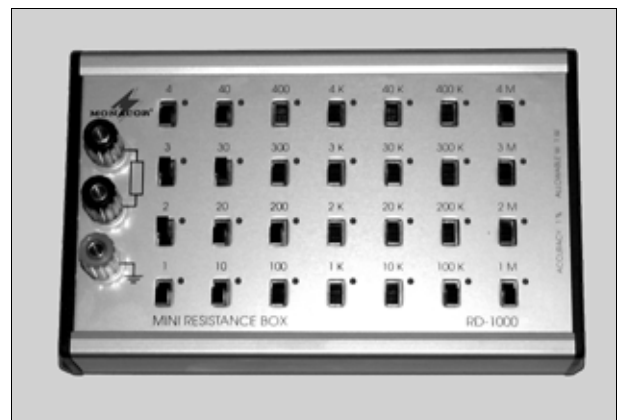
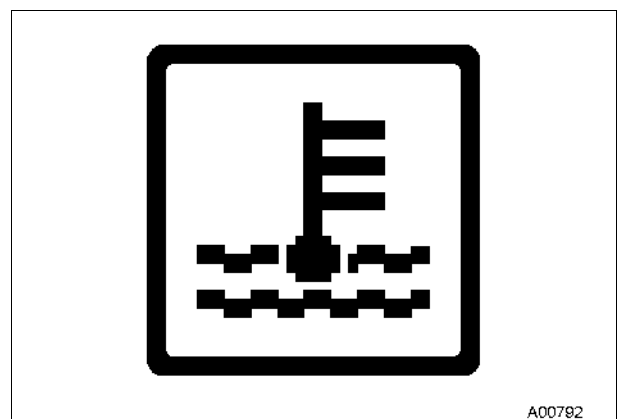
NOTE: Allow preconditioning time.

Fig. 310.

1000639

Warning message: coolant temperature.



A00792

Fig. 311.

1001606

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

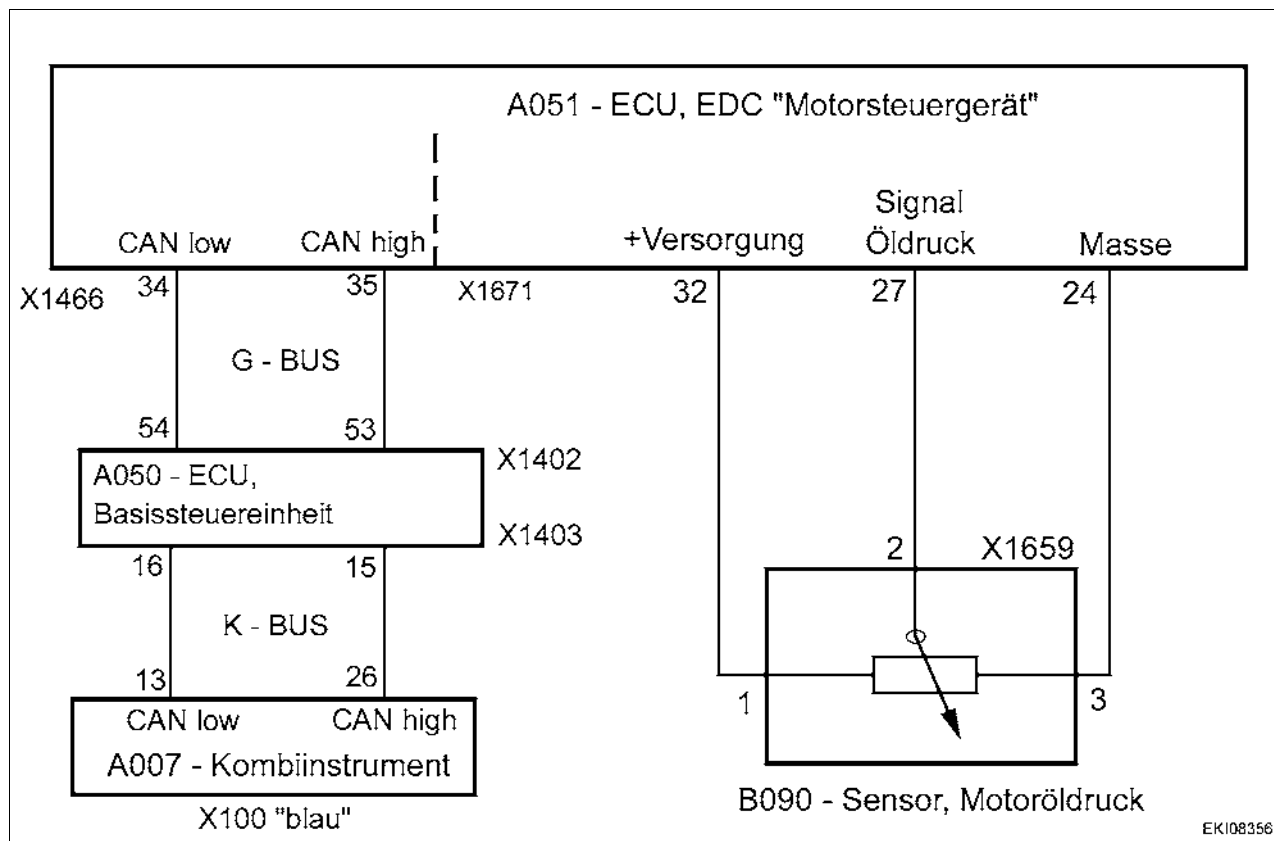
82 B090 engine oil pressure sensor**NOTE:** see §1

Fig. 312.

EK108356

1001614

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.

1001087

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

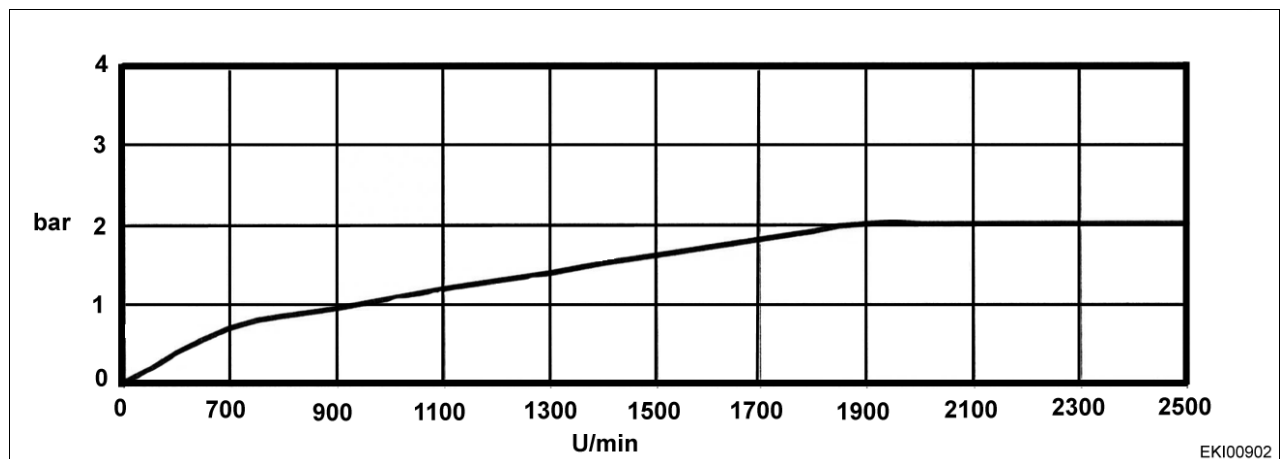
Fit measurement adapter M10x1 (X598.303.000.000) on oil filter console (arrow).



Fig. 314.

EK108498
I002048

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

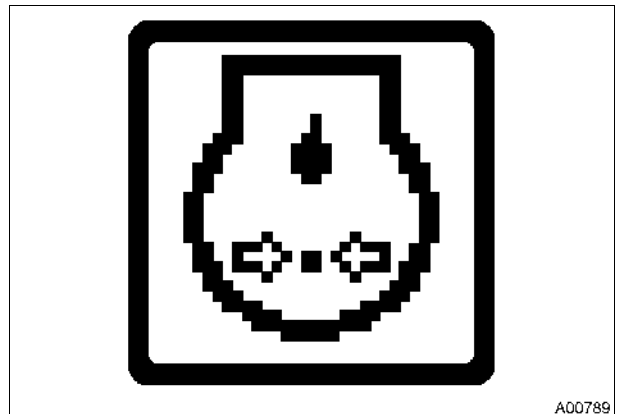


EK100902

Fig. 315.

I001615

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



A00789

Fig. 316.

I001616

83 B091 water in fuel sensor

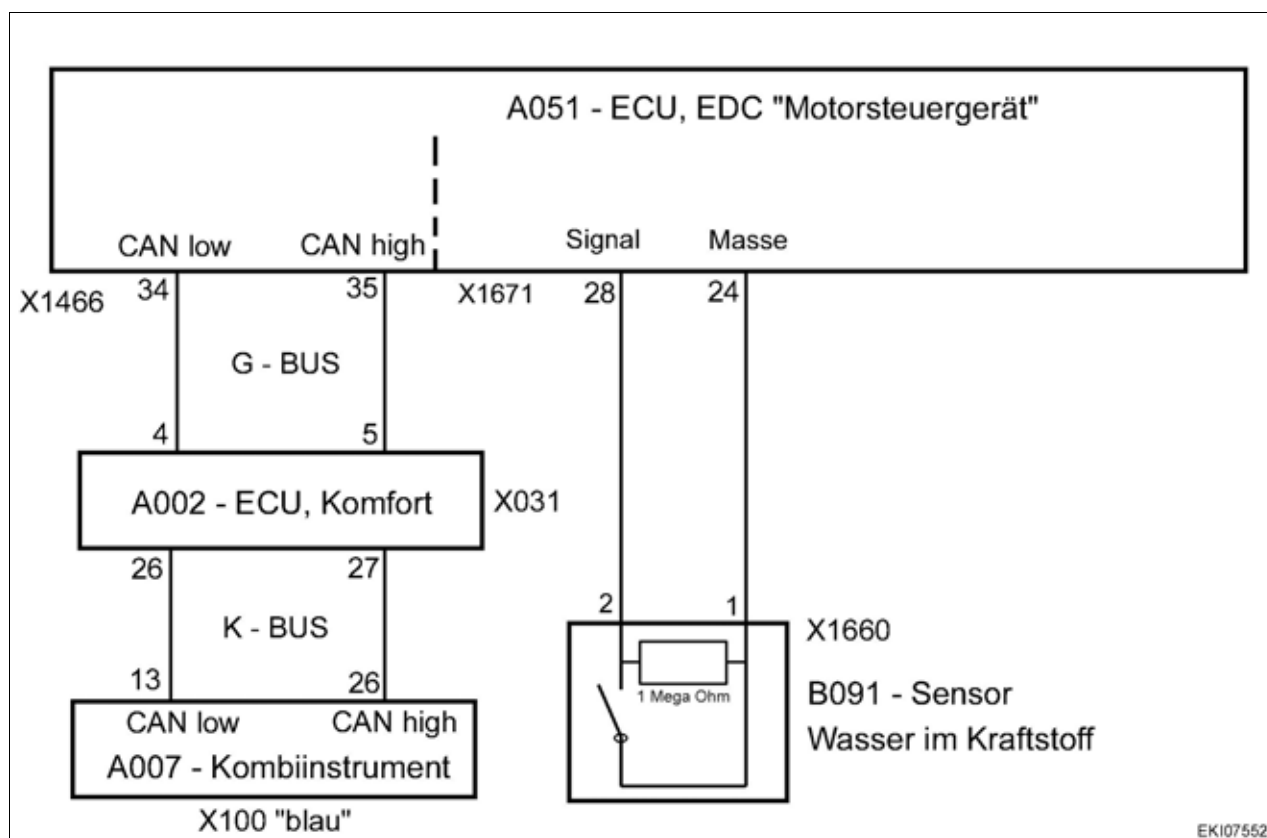


Fig. 317.

EK107552

1001619

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

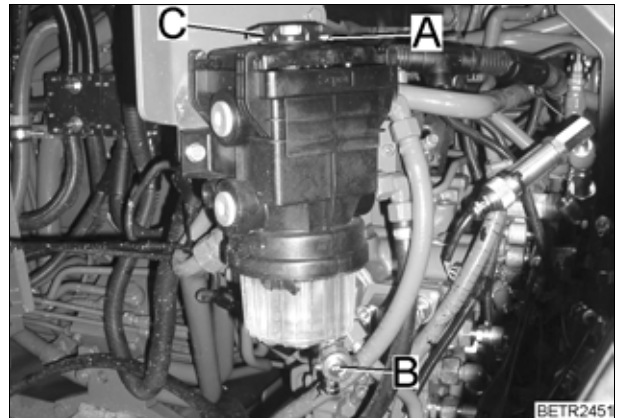


Fig. 318.

1001585

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

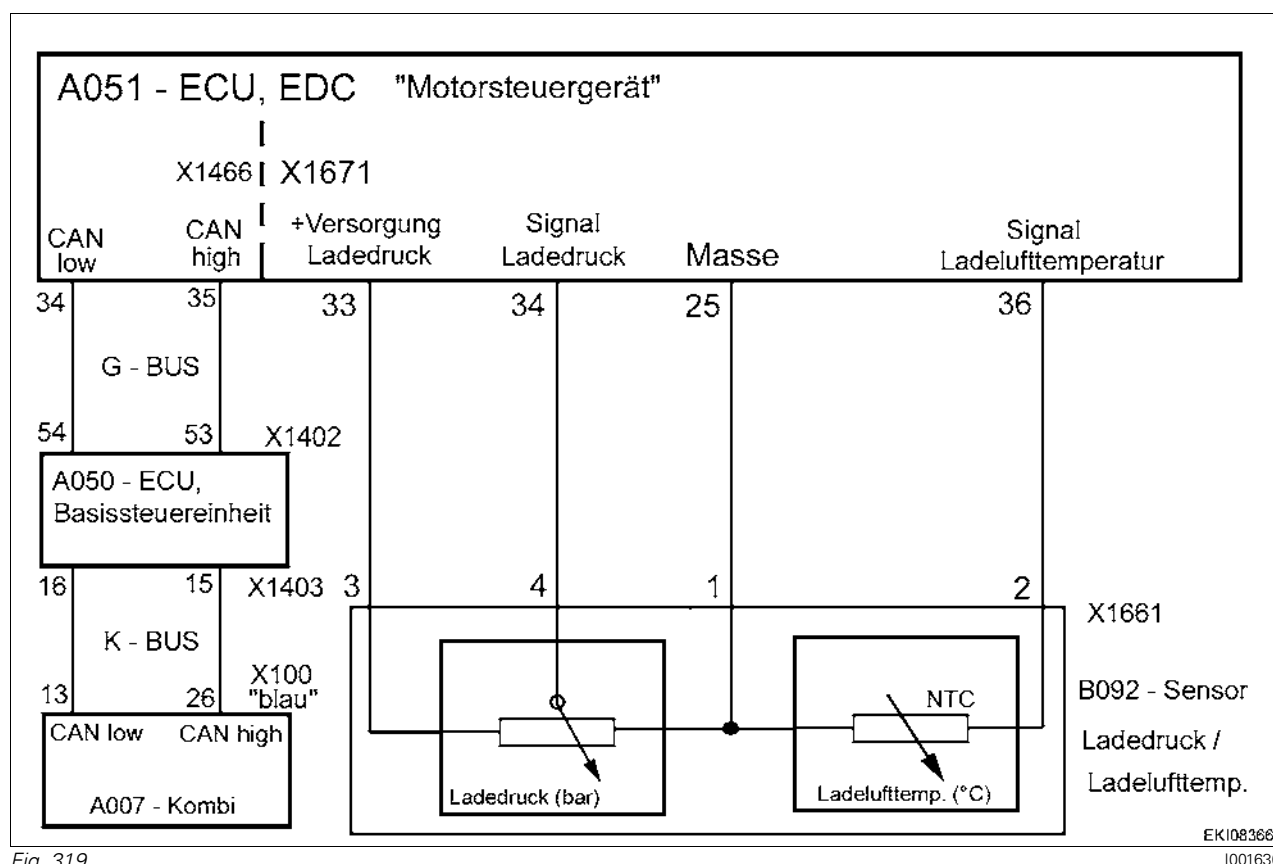


Fig. 319.

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)

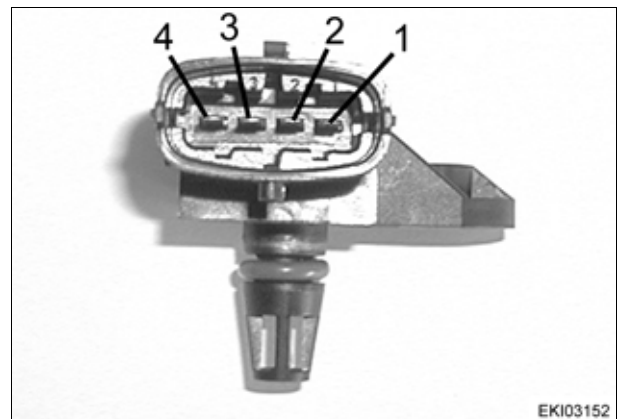


Fig. 320.

EK103152

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.

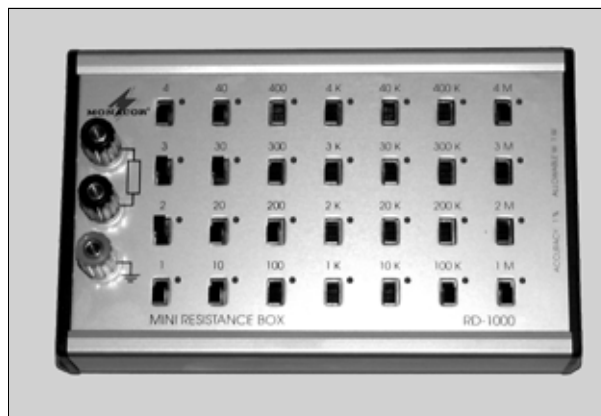
Select the corresponding resistance (i.a.w. table).

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.



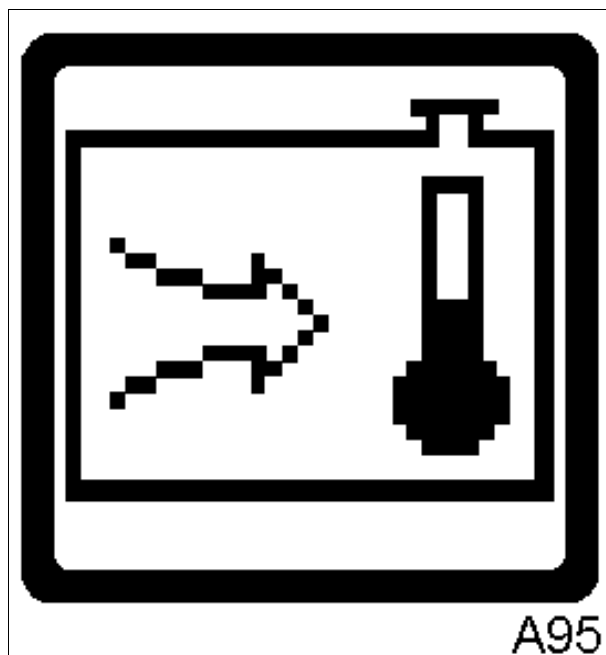
Charge air temperature warning message.

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.)

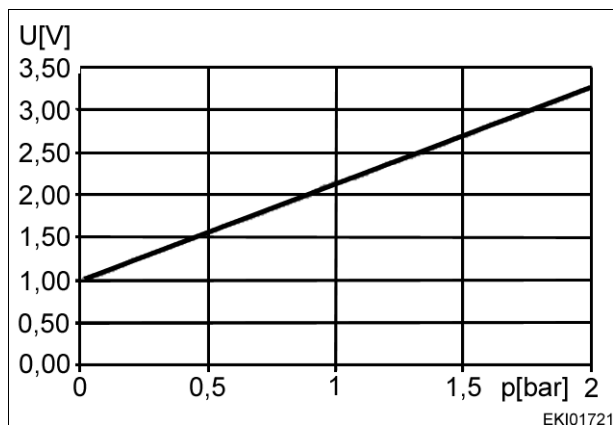


Fig. 323.

EKI01721

I001635

Boost pressure	Signal voltage
(bar)	(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.

1001089

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.

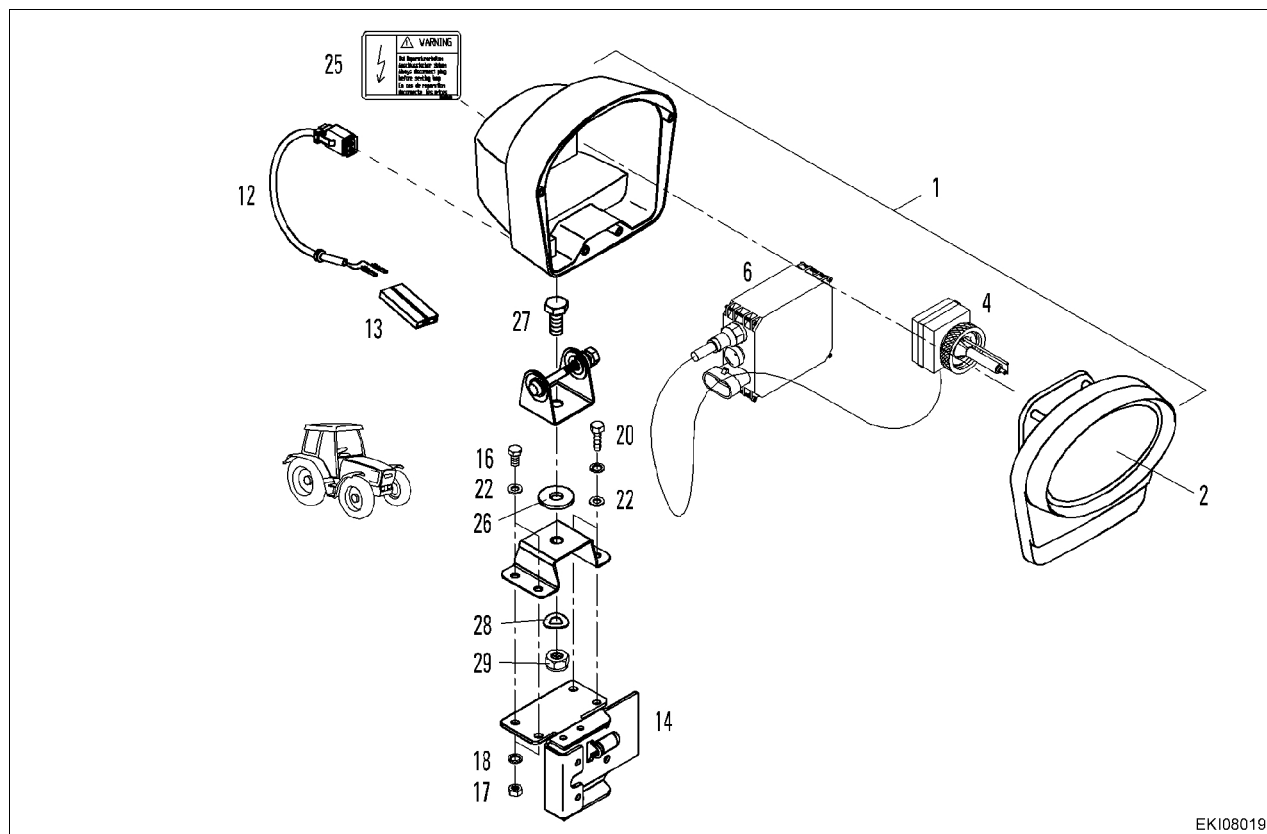
I002038

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-

T000759
 Version 2
 04-09-2009



EKI08019

Fig. 329.

1002189

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.

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. 331.

EKI09210
1004891



Fig. 332.

1001139

Cable routing from EU control device



Fig. 333.

EKI09214
1004895

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)

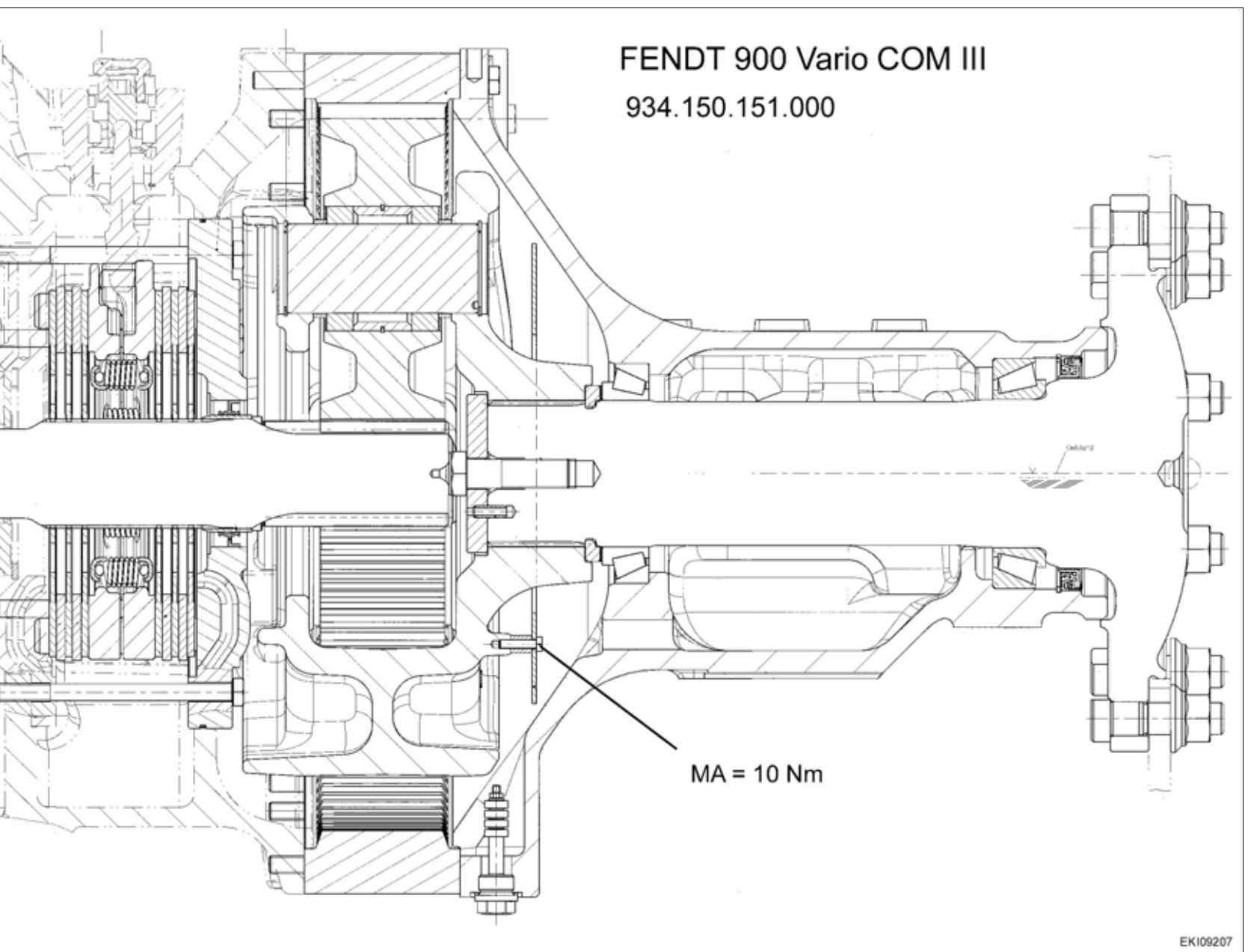


Fig. 337. Right rear axle

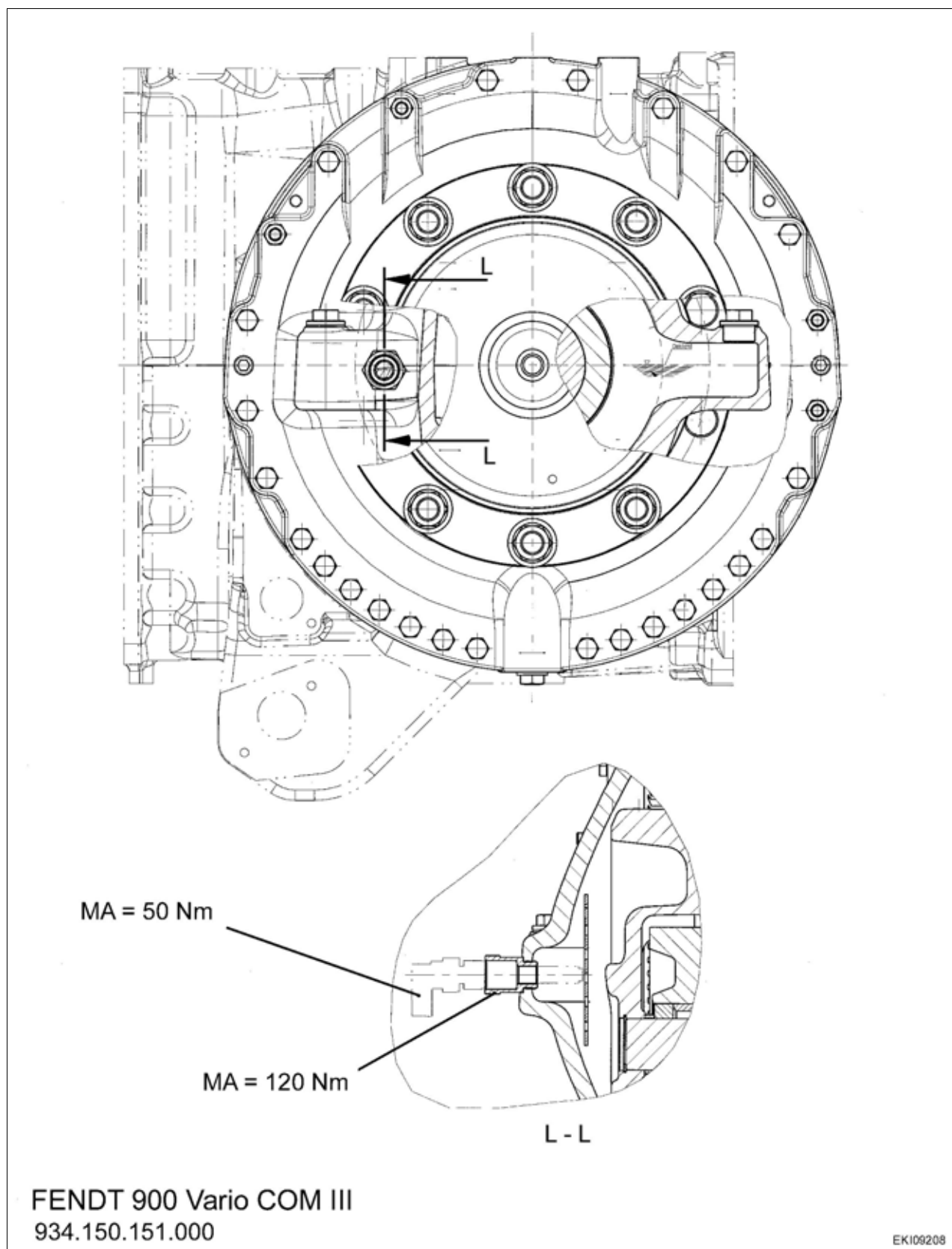


Fig. 338. Right rear axle

I004897

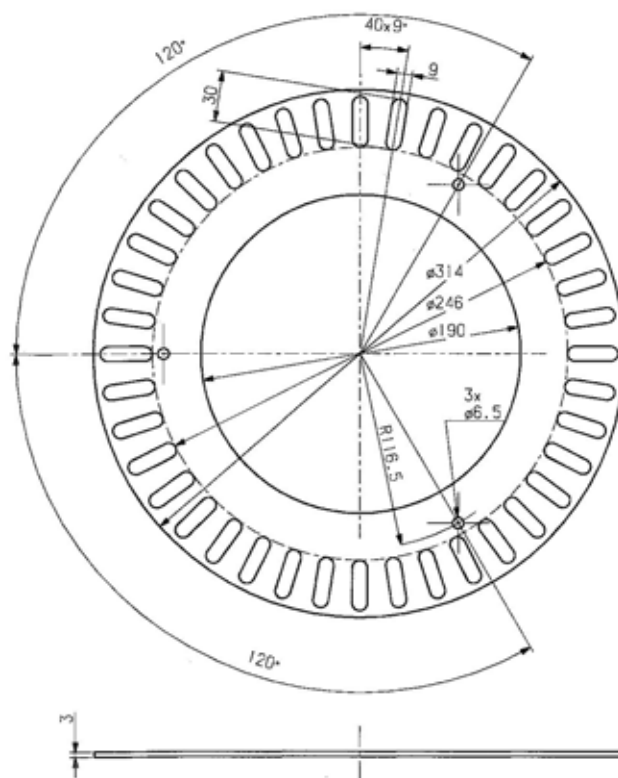
919 .. 0101-1000
919 .. 1001-
922 .. 0101-1000
922 .. 1001-
925 .. 0101-1000

925 .. 1001-
928 .. 0101-1000
928 .. 1001-
931 .. 0101-1000
931 .. 1001-

934 .. 0101-1000
934 .. 1001-

T001526
Version 1
21-04-2009

934.150.151.030



EK109209

Fig. 339. Ratchet wheel

1004898

87 E063 heater element (air dryer)

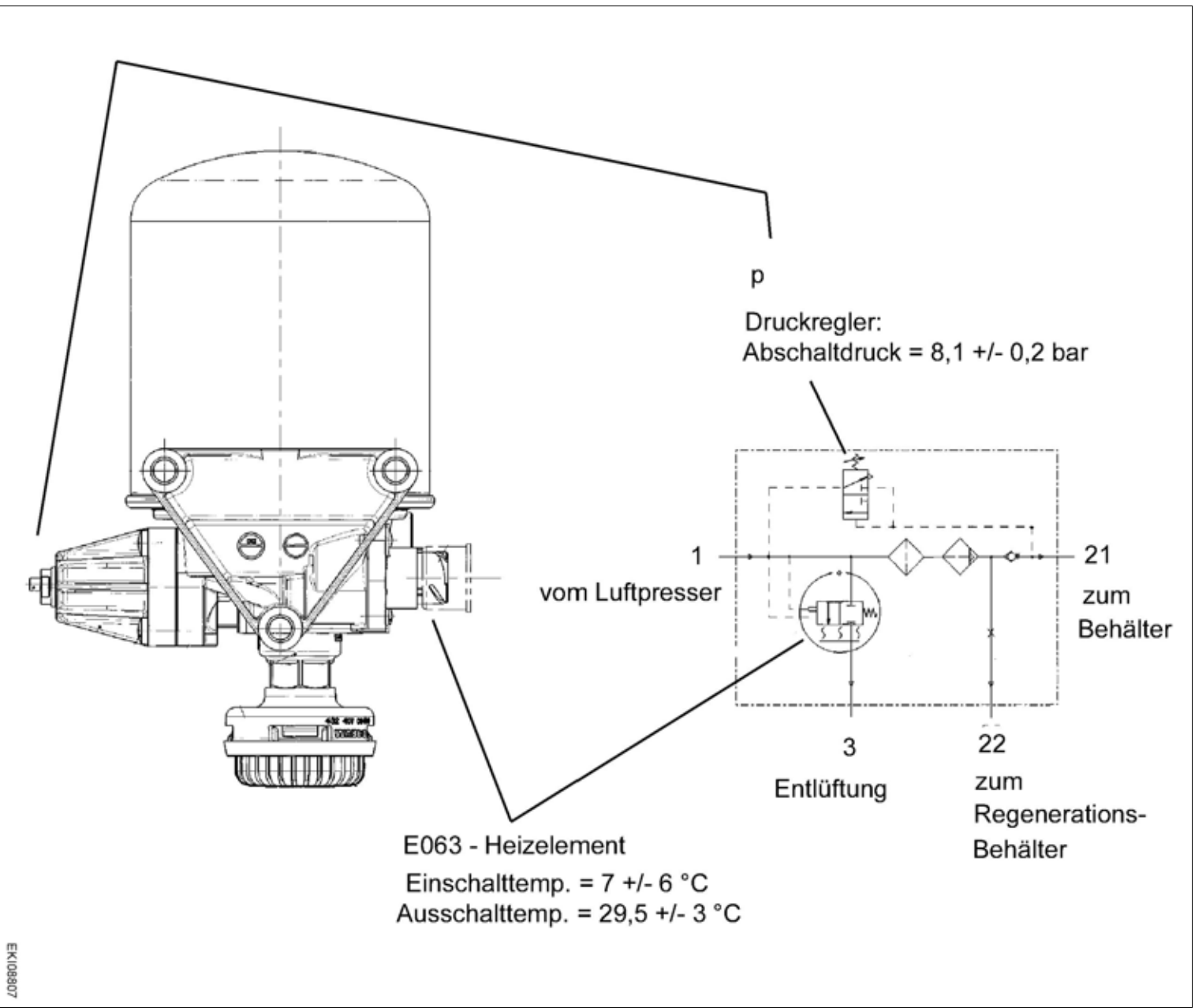


Fig. 340.

EK108907
1002745

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

T001233
Version 1
04-09-2009

351

E063 - Heater element, air dryer (temperature-controlled)

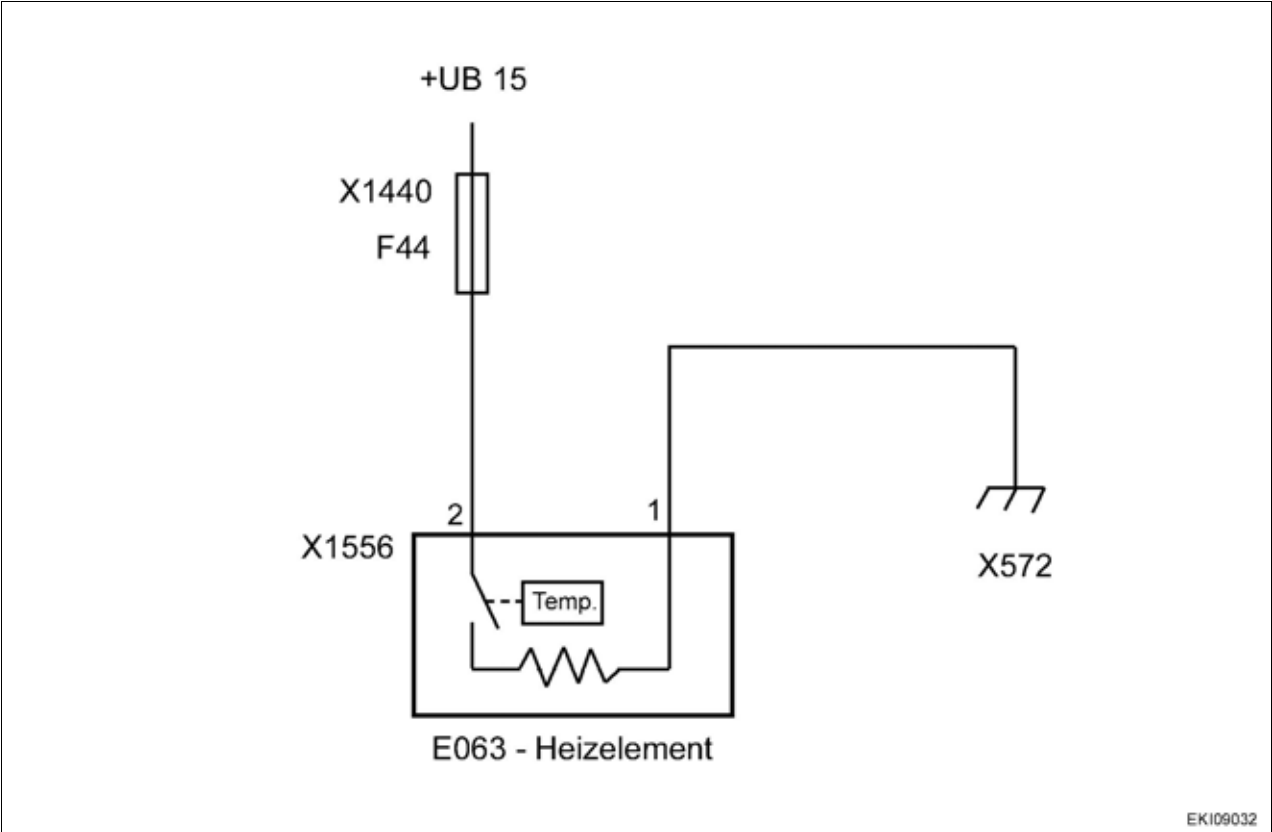


Behind right rear axle



Fig. 341.

I000486



EK109032

Fig. 342.

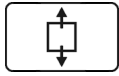
I003634

88 G001 battery / K068 battery disconnect relay

G001 Battery (12 VDC/170 Ah)



On right entry step.



Remove cover.



Fig. 343.

1001104

Technical data		
	Speci- fied 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.

1000749

S092 battery disconnect switch "master switch"

K068 battery disconnect relay (optional).



Fig. 345.

1001139

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

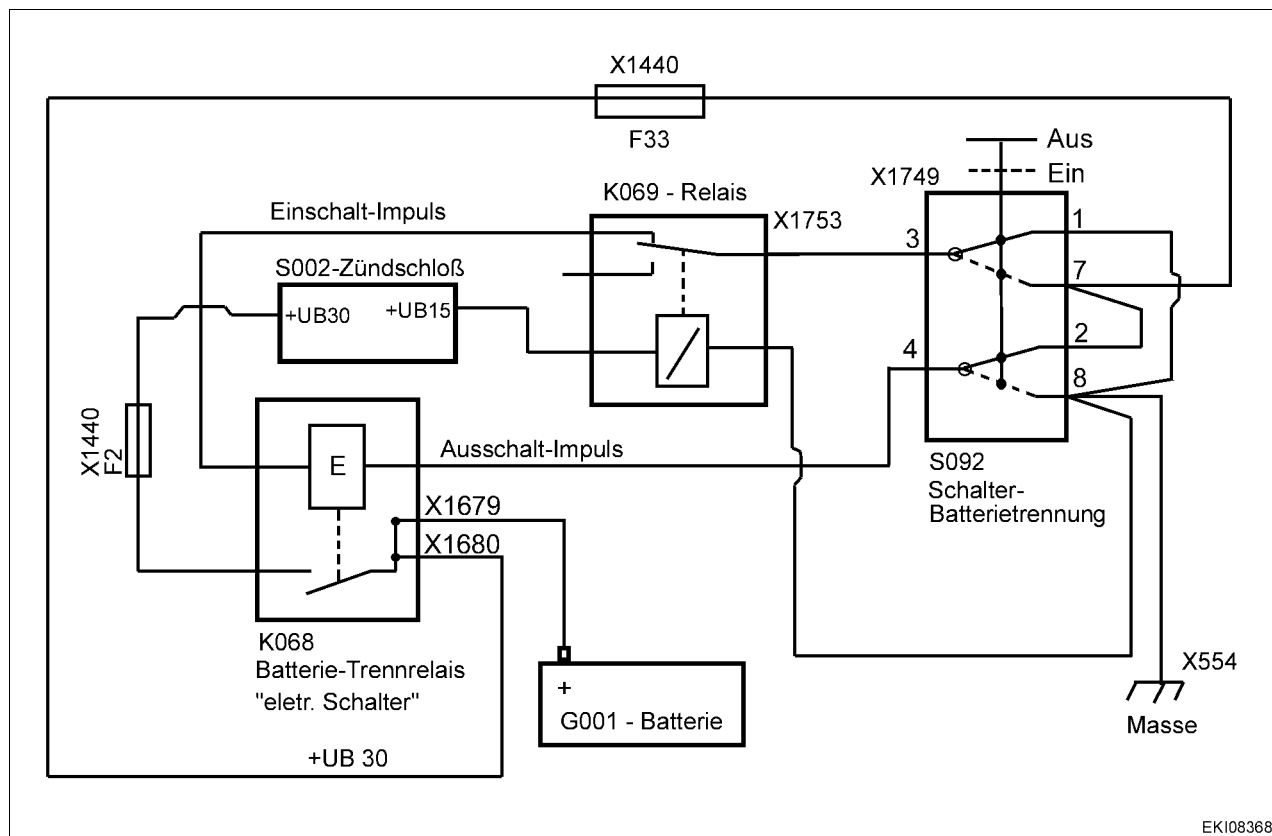


Fig. 346.

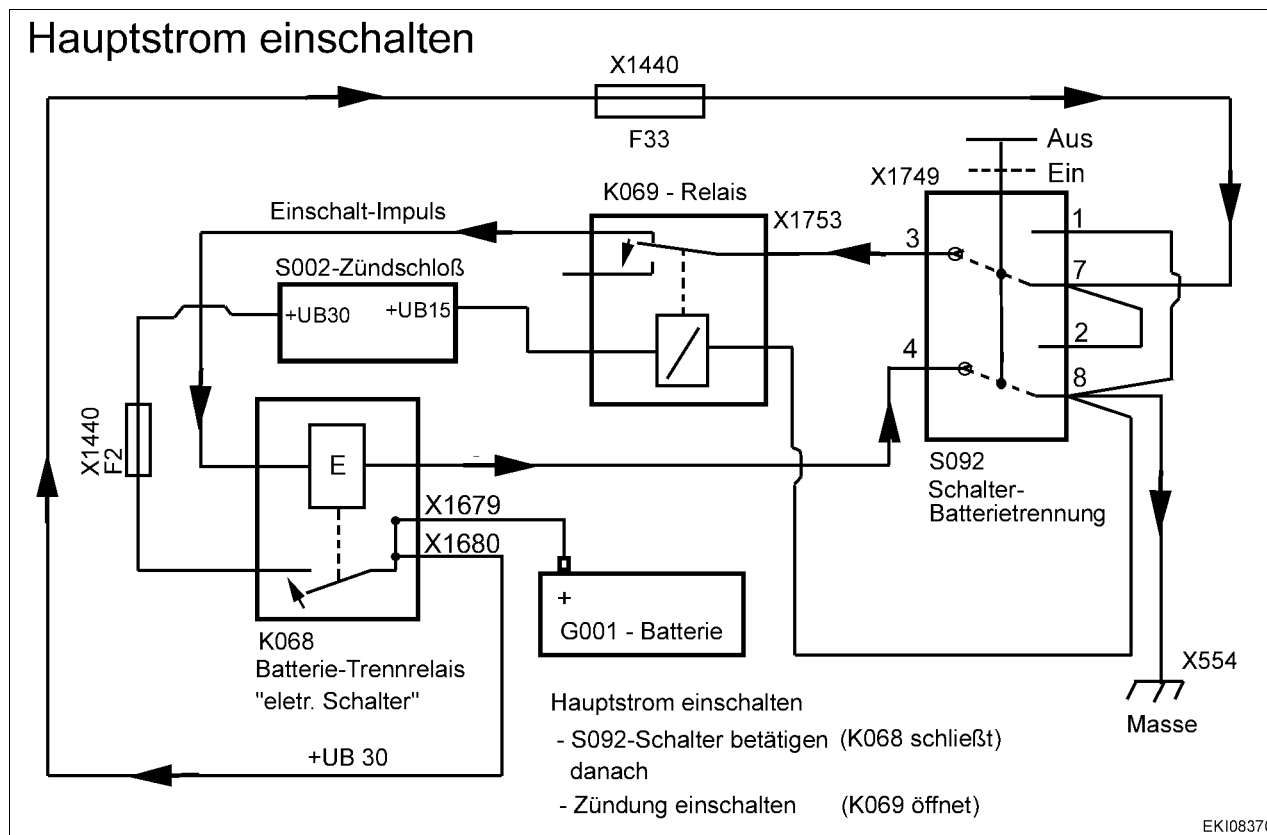
EKI08368

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



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

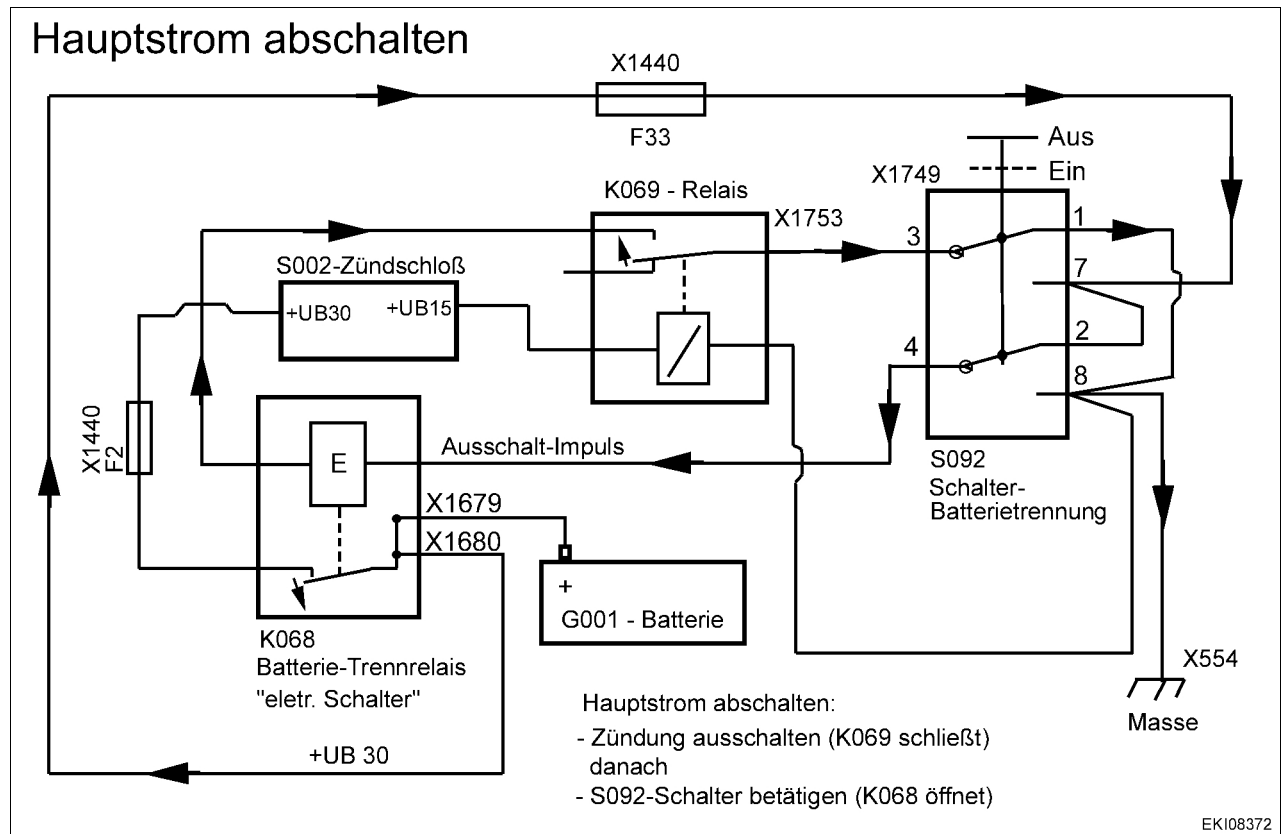


Fig. 348.

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

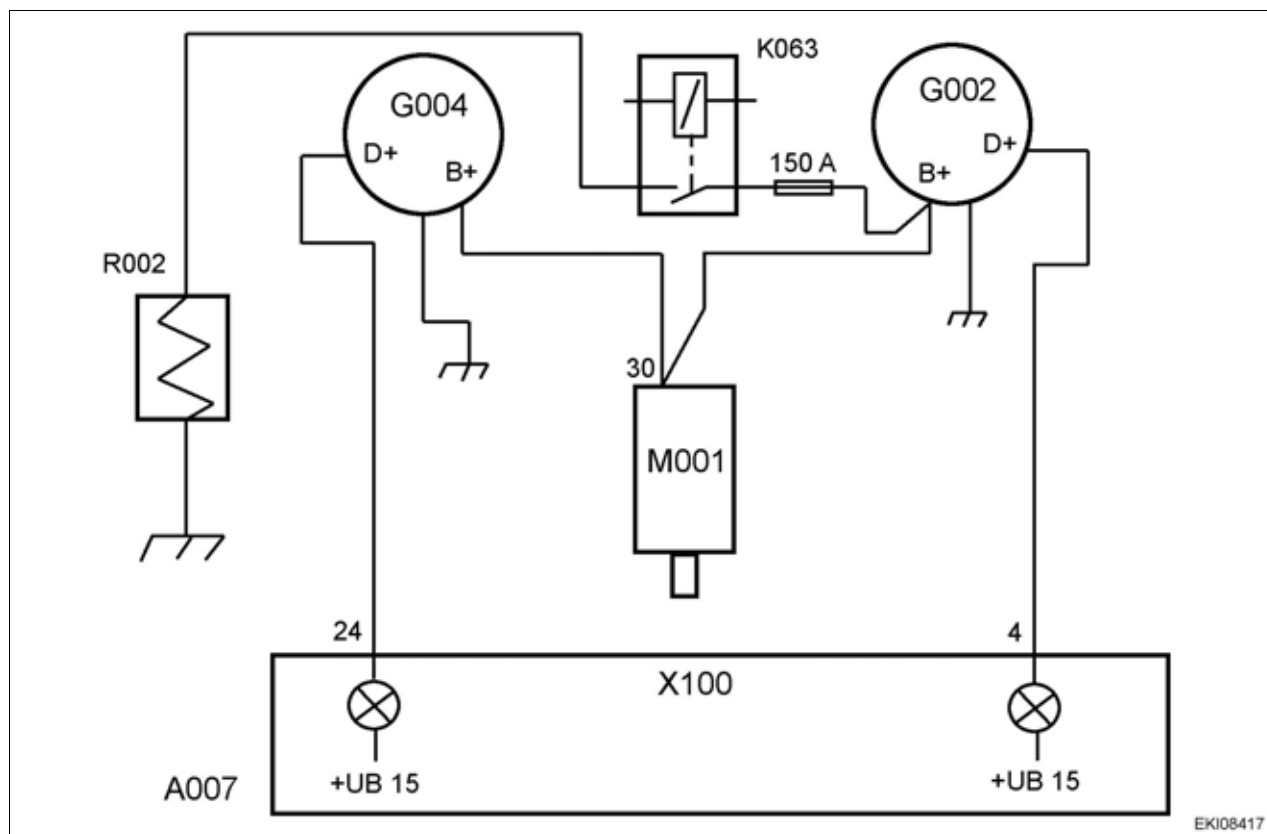


Fig. 349.

1002397

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.

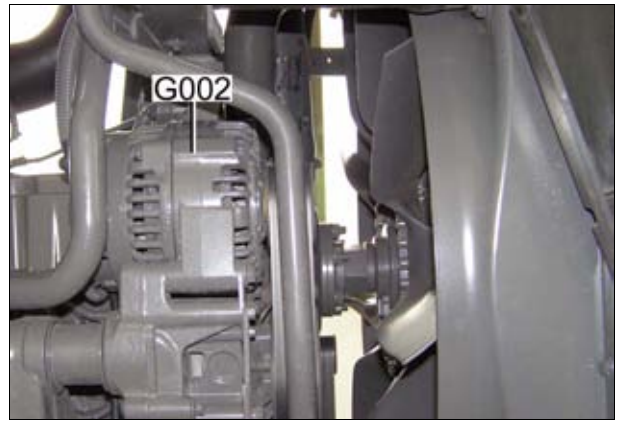


Fig. 350.

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

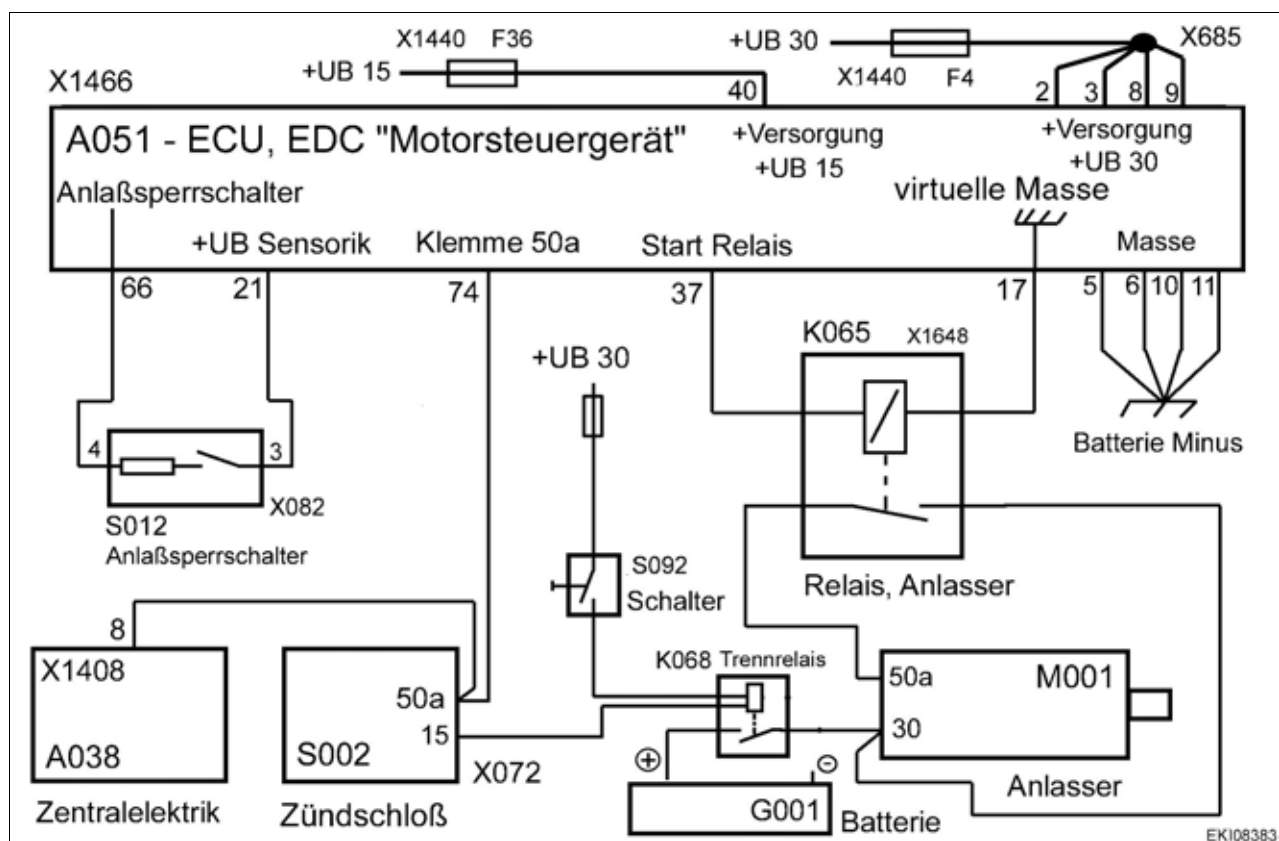
Actuation of **M001** - starter.

Fig. 354.

EK108383
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 588
X1440	Fuse holder	

Checking voltage and power consumption at **M001** - starter.

Pin	Function
30	Input directly from bat- tery+
50	Starter control

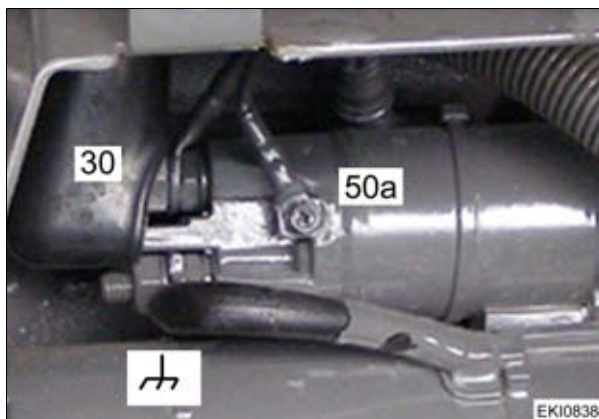


Fig. 355.

1001651

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.

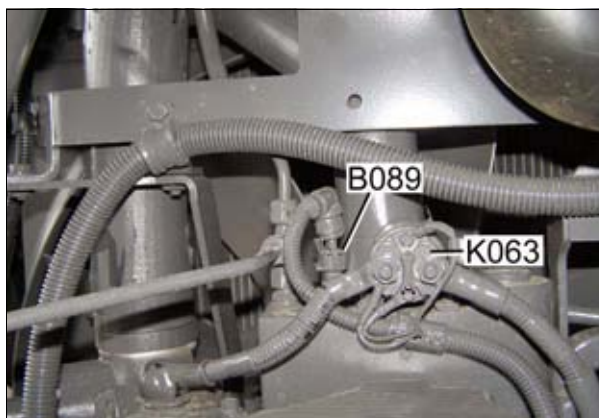


Fig. 356.

1001611

Circuit diagram of K063 - Heater flange relay

NOTE: Inductive resistance = 20 ohms +/- 10%

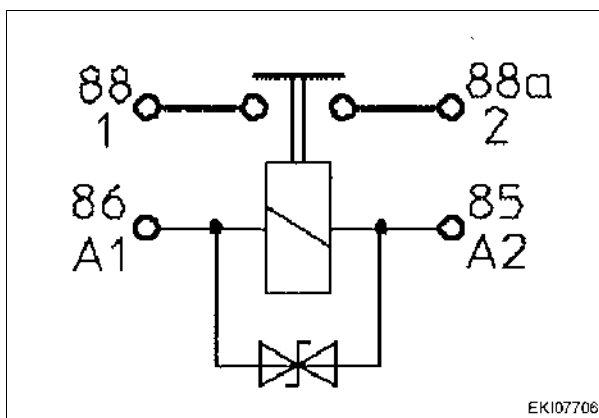


Fig. 357.

EK107706

1000767

Unscrew terminal 85.

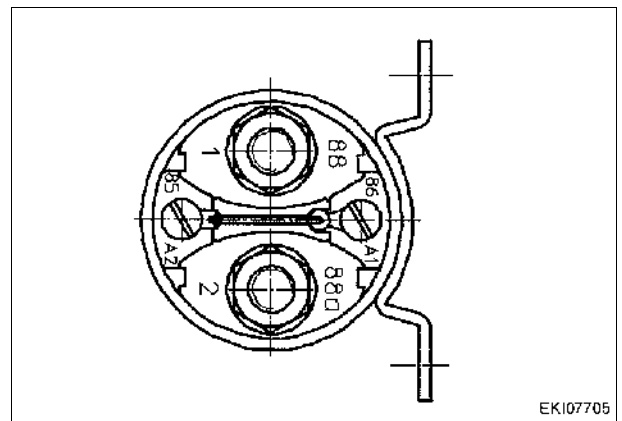


Fig. 358.

EKI07705

I000768

Disconnect the **X1671** - Separation point on A051 (prevents the engine from starting)

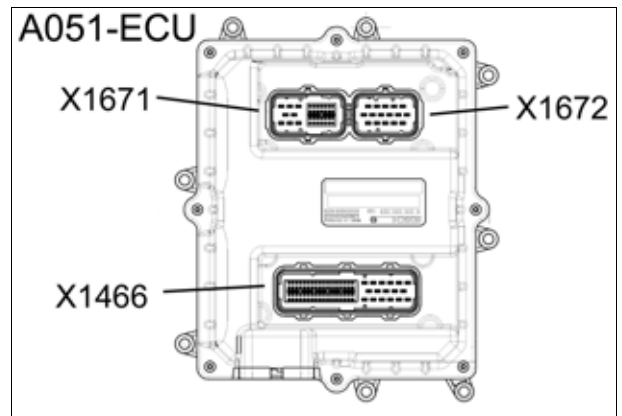


Fig. 359.

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.

EKI08596

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.

EKI08597

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.

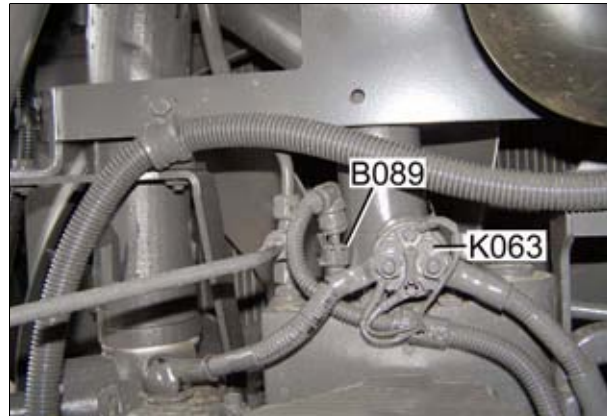


Fig. 362.

I001611

When screwing in the terminals, note:

Thread M8 = 12 to 13 Nm

Thread M3.5 = 1.1 ... 1,2 Nm

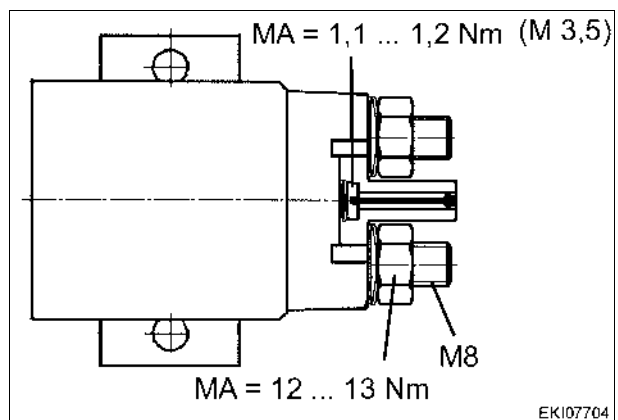


Fig. 363.

EKI07704
 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).

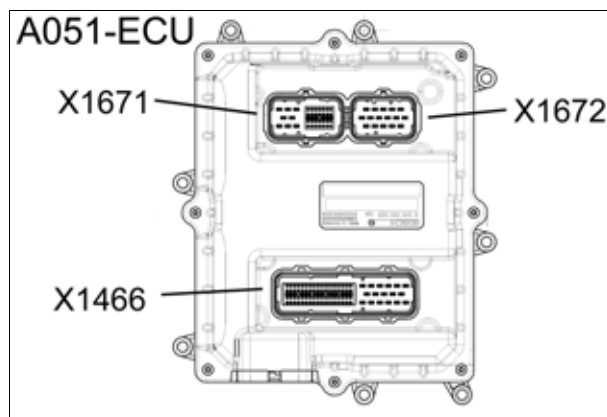


Fig. 364.

I000621

NOTE: see §13
 see §14

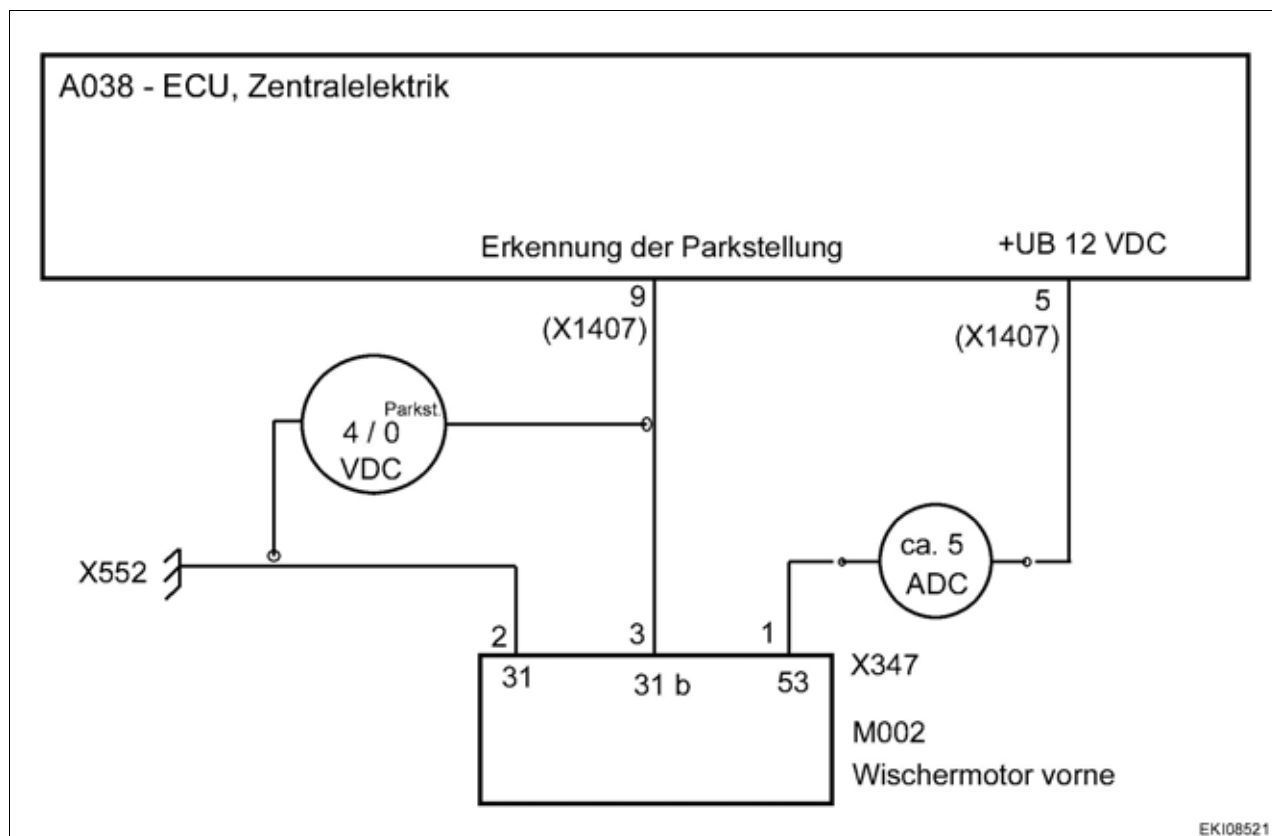
91 M002 front wiper motor

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.

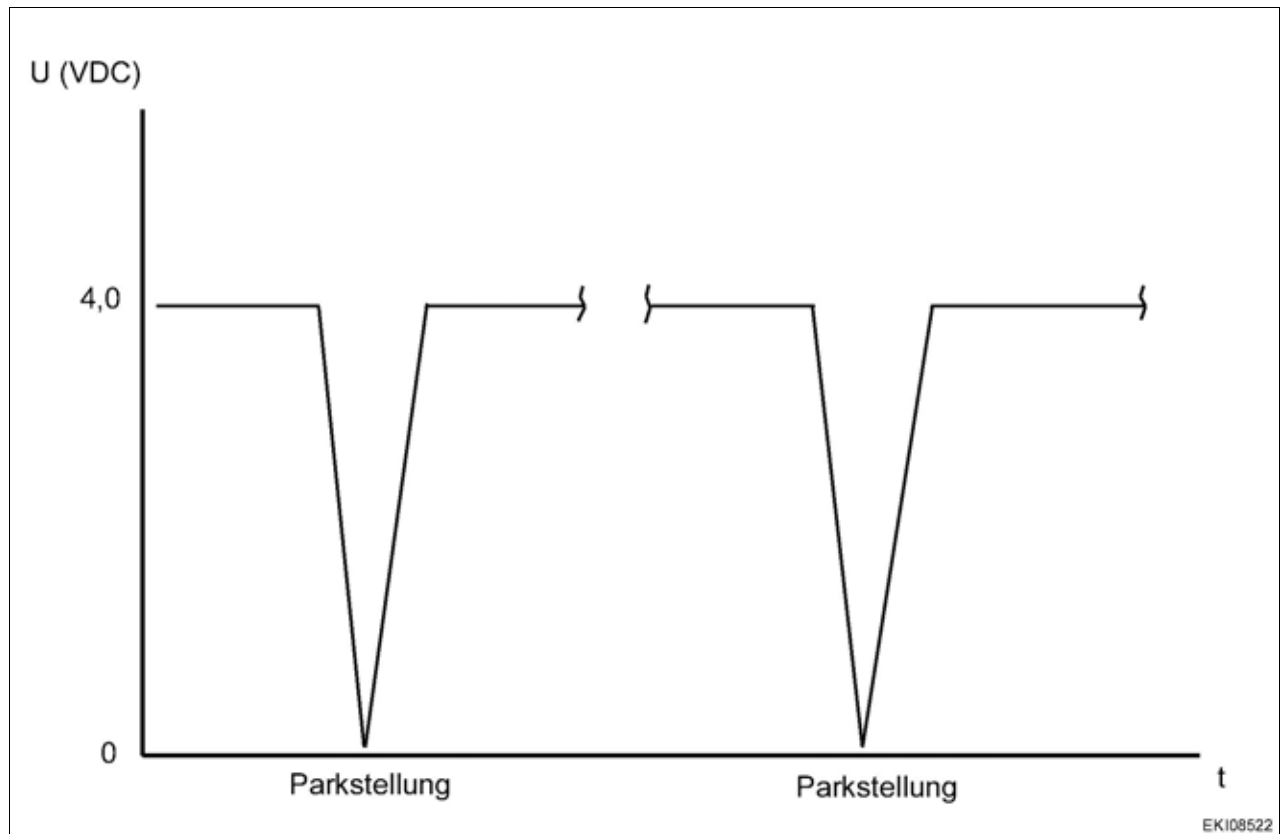


Fig. 367.

I002230

92 M003 / M005 front/rear wiper pump

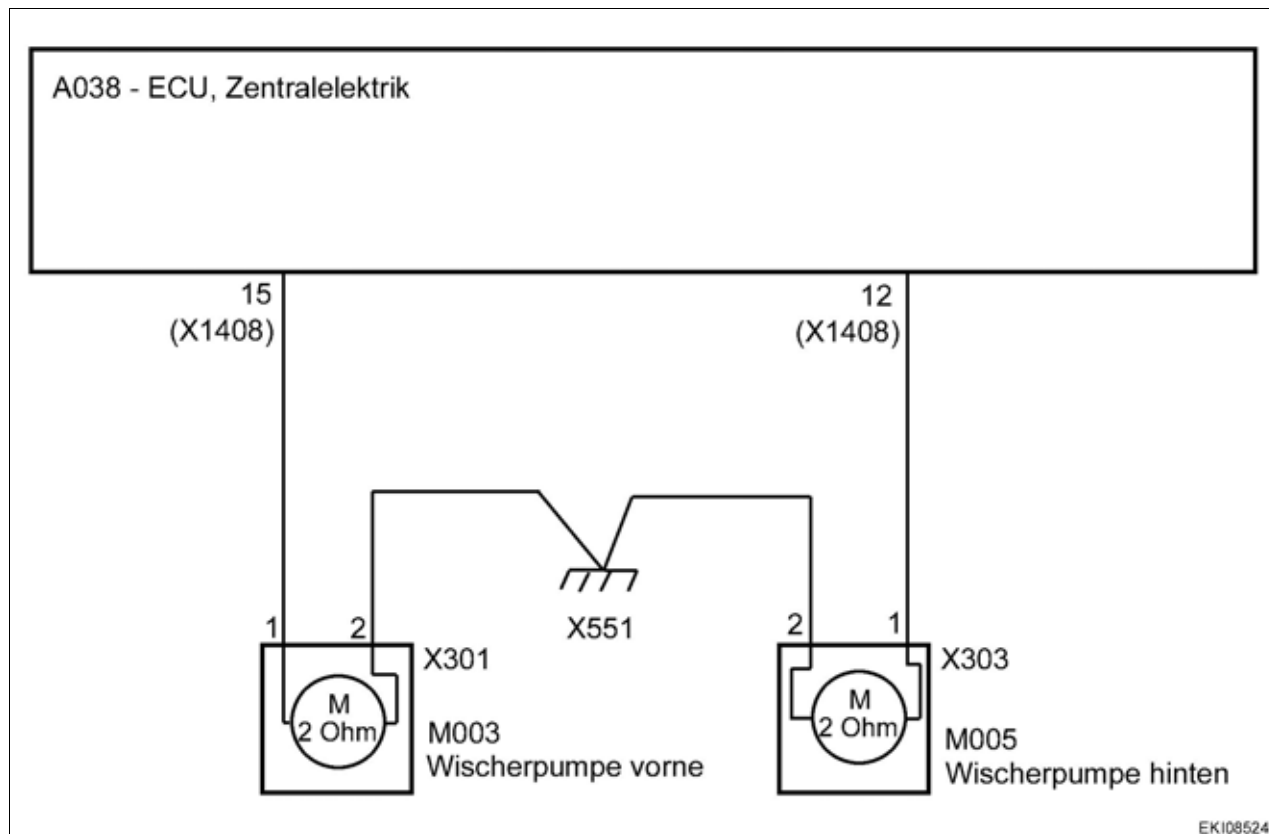


Fig. 368.

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](#)

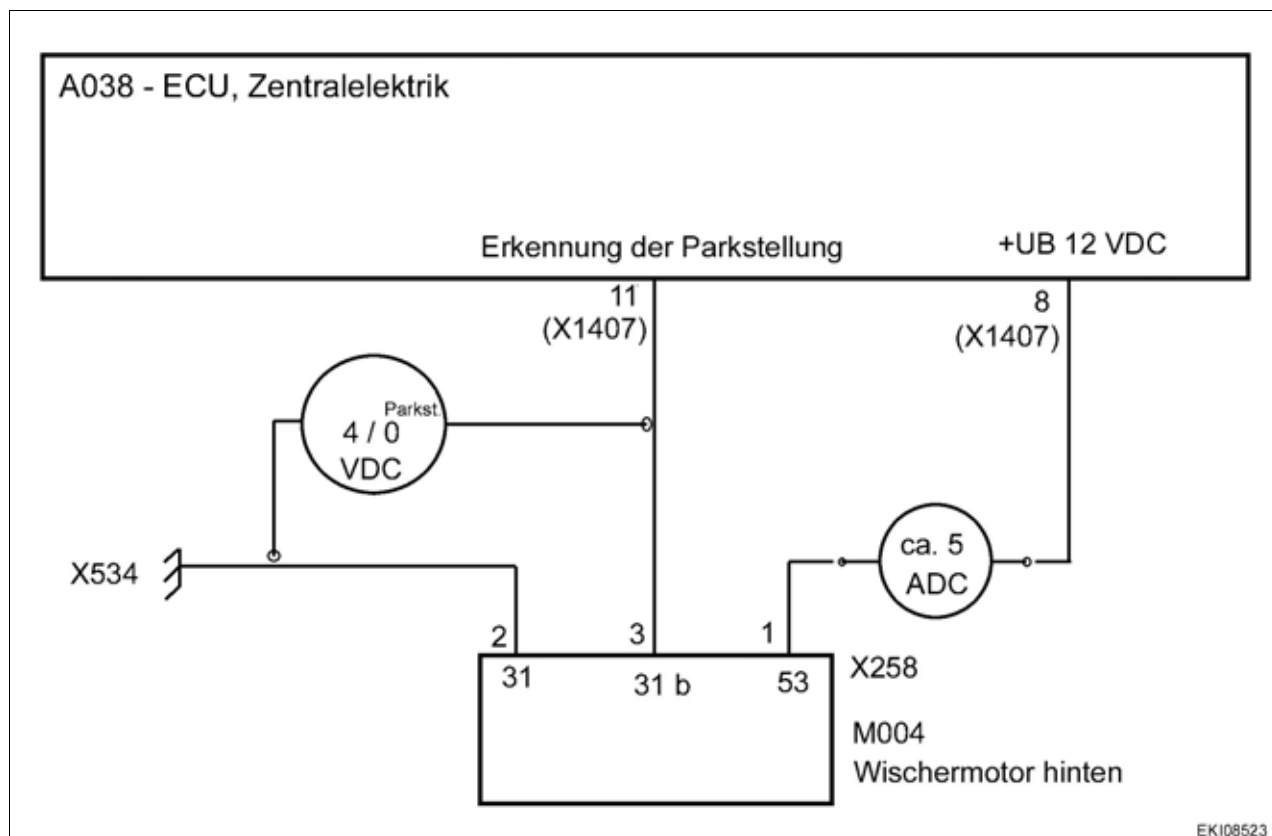
93 M004 wiper motor, rear

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.

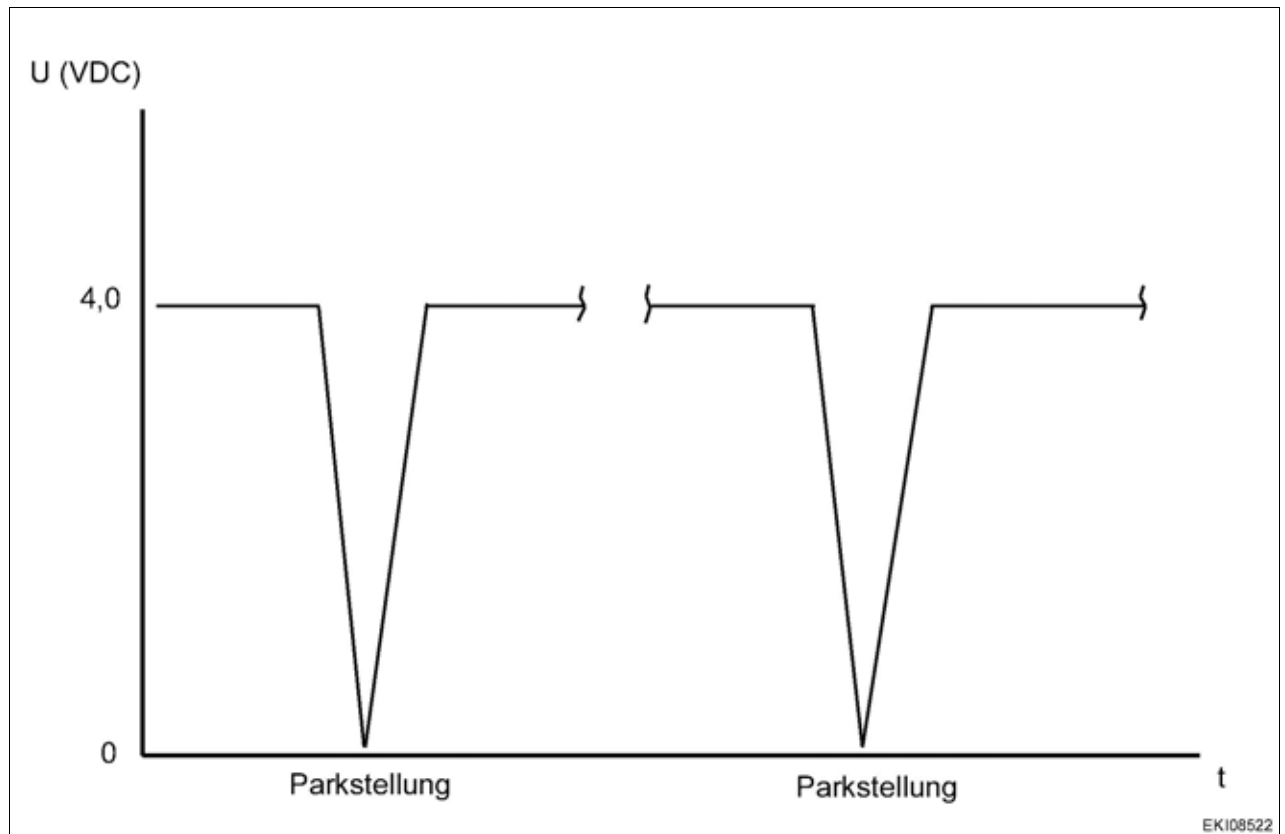


Fig. 372.

1002230

94 M010 fuel pump

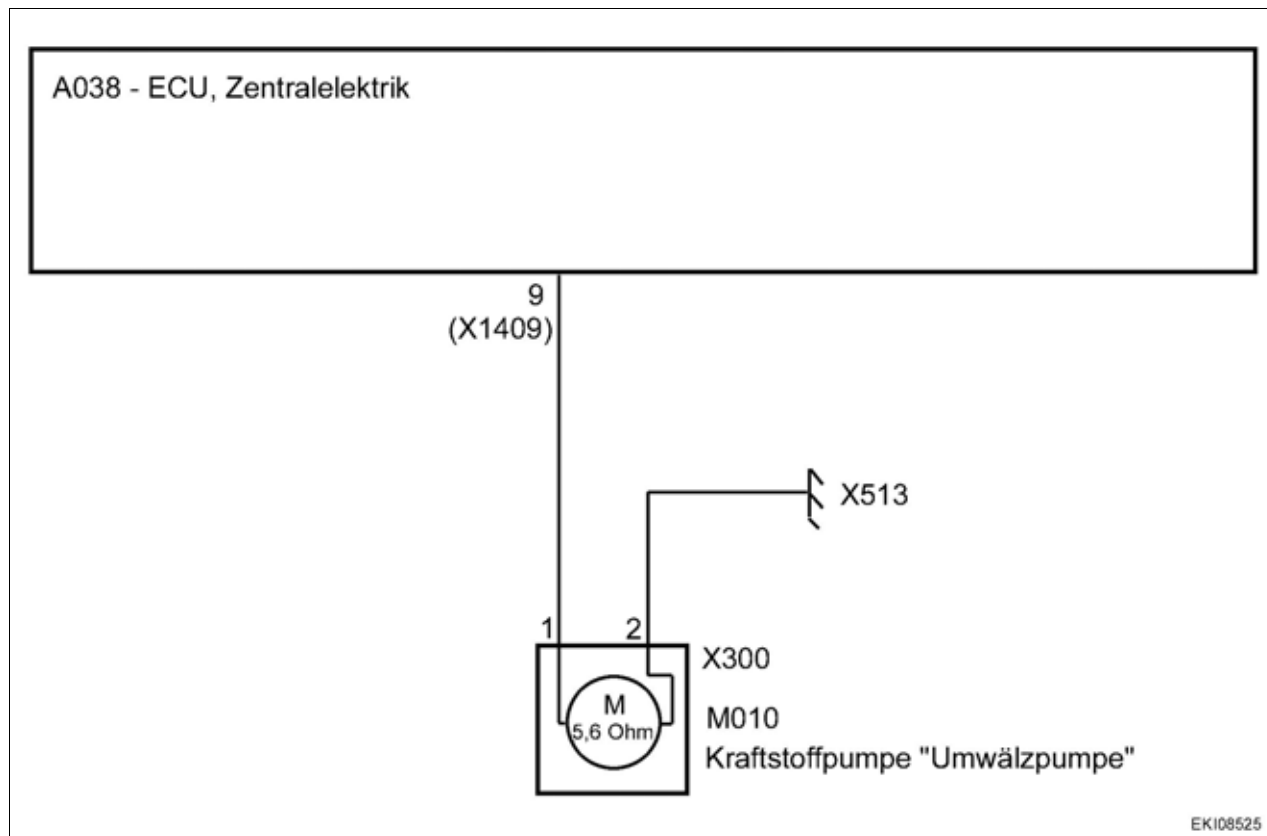


Fig. 373.

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

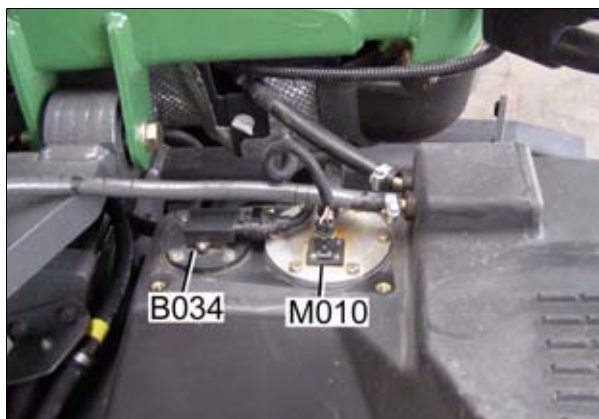


Fig. 374.

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

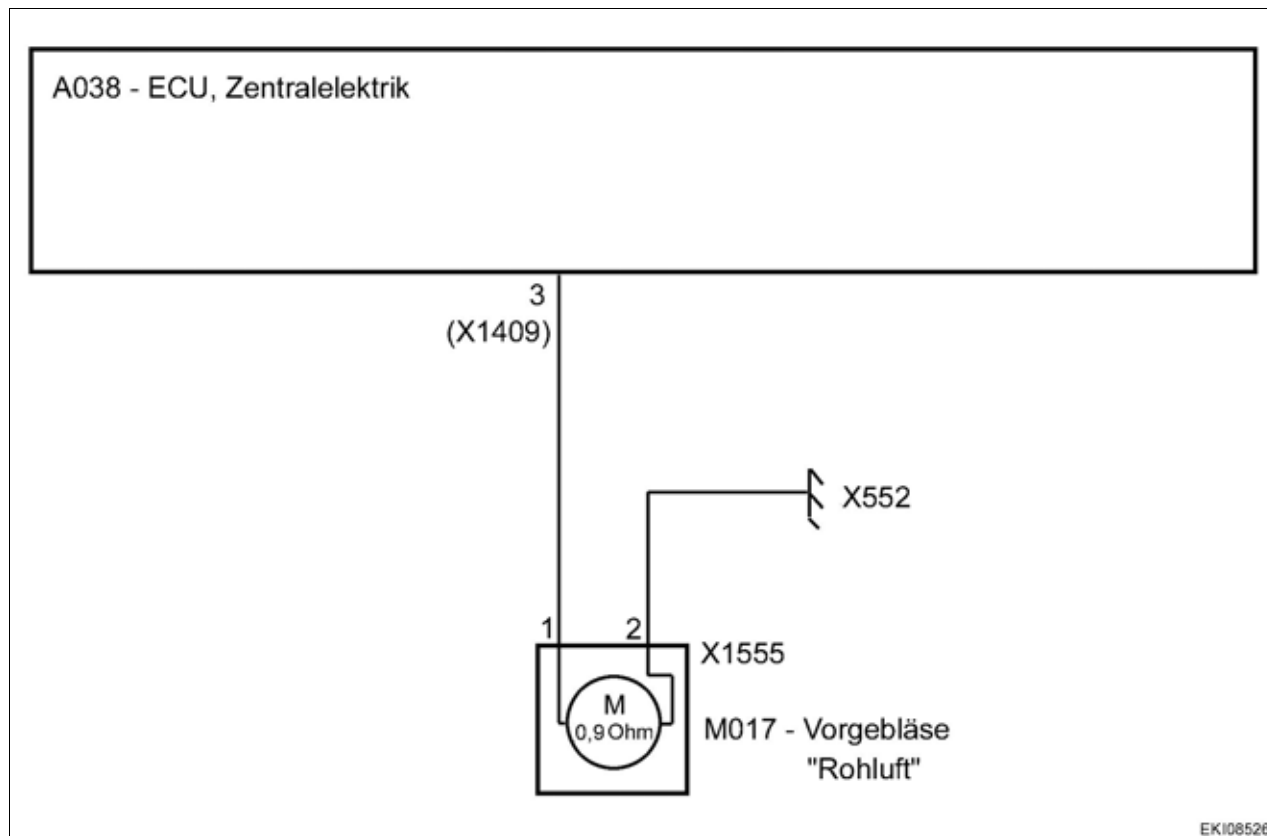


Fig. 375.

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

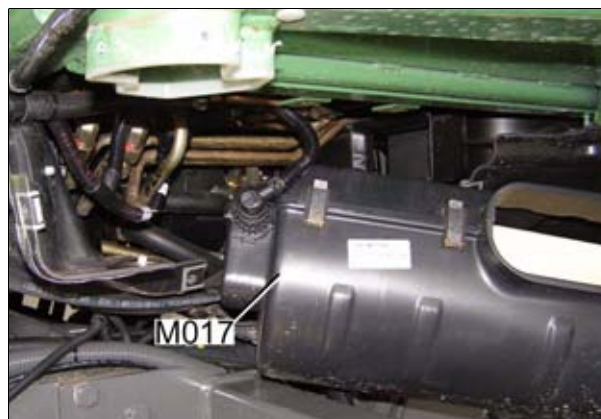


Fig. 376.

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

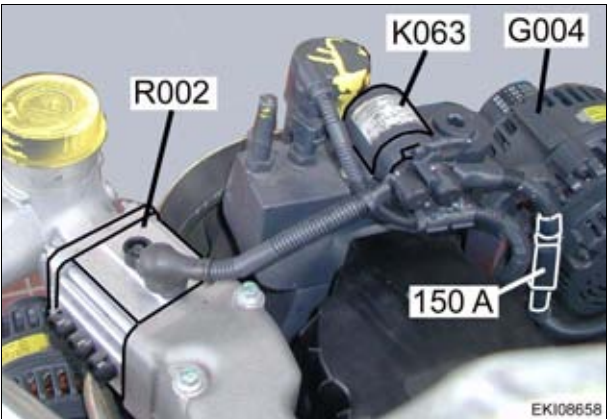


Fig. 377.

1002531

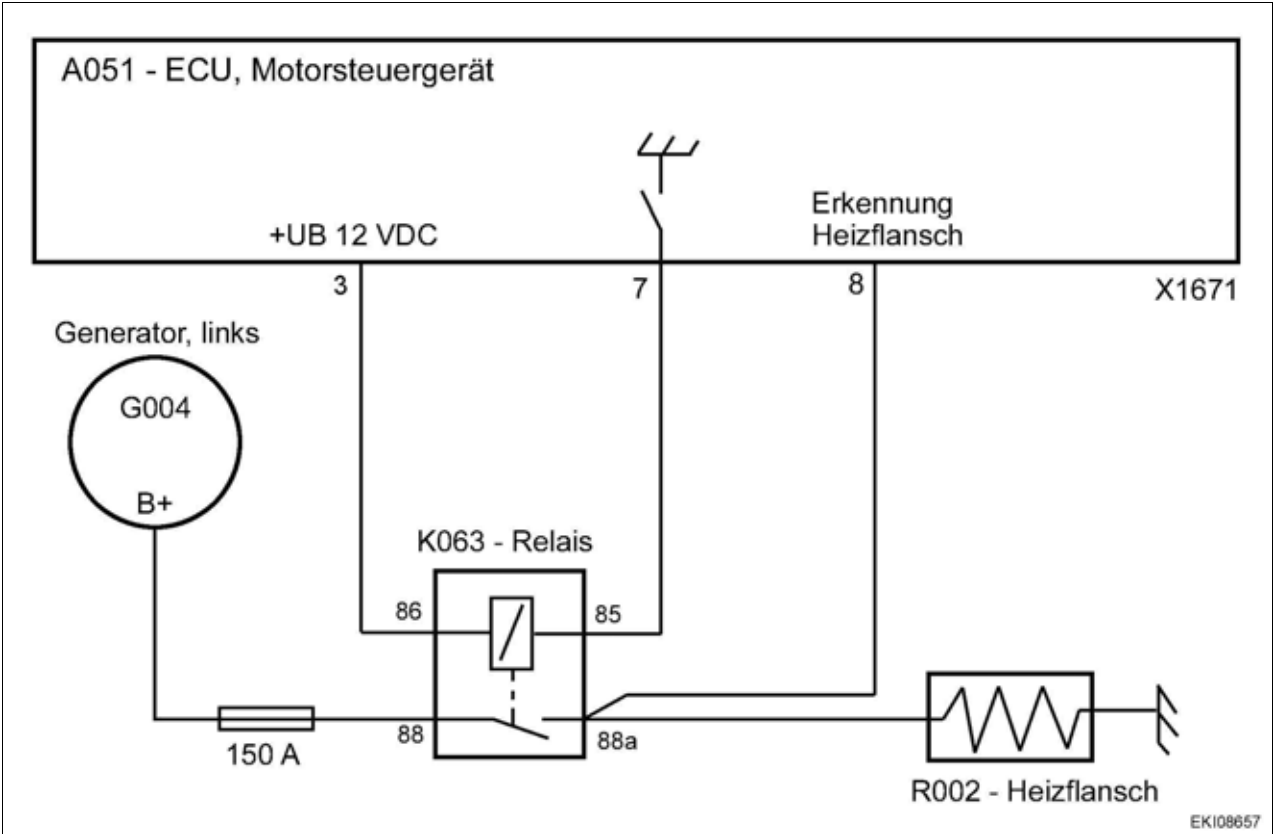


Fig. 378.

1002530

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.

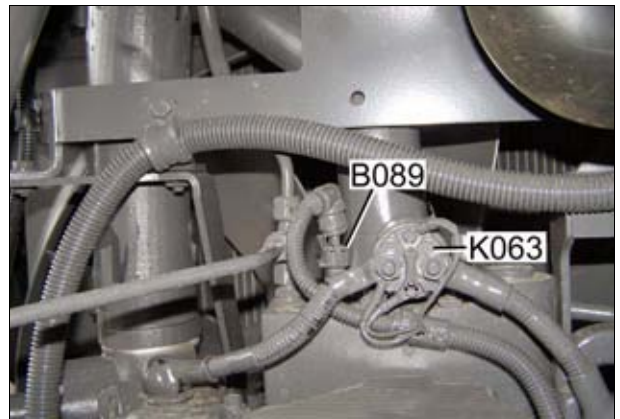


Fig. 379.

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%

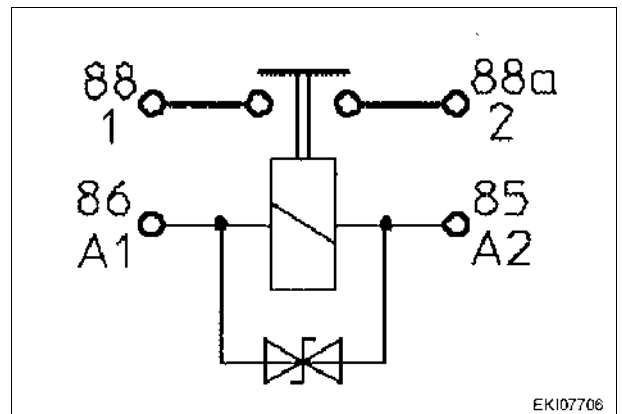


Fig. 381.

EKI07706

I000767

Pin	Function
86	Inductive input
85	Inductive output
88	Pin entry
88a	Pin output

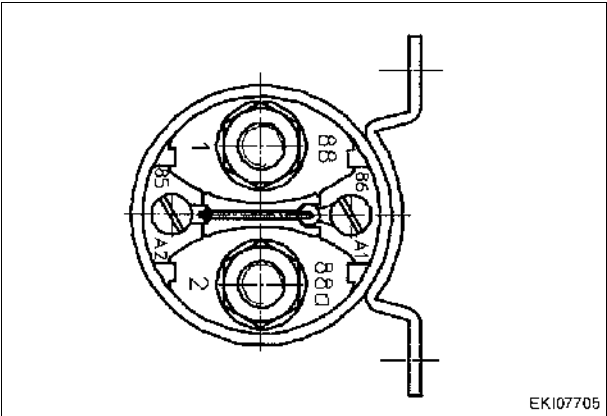


Fig. 382.

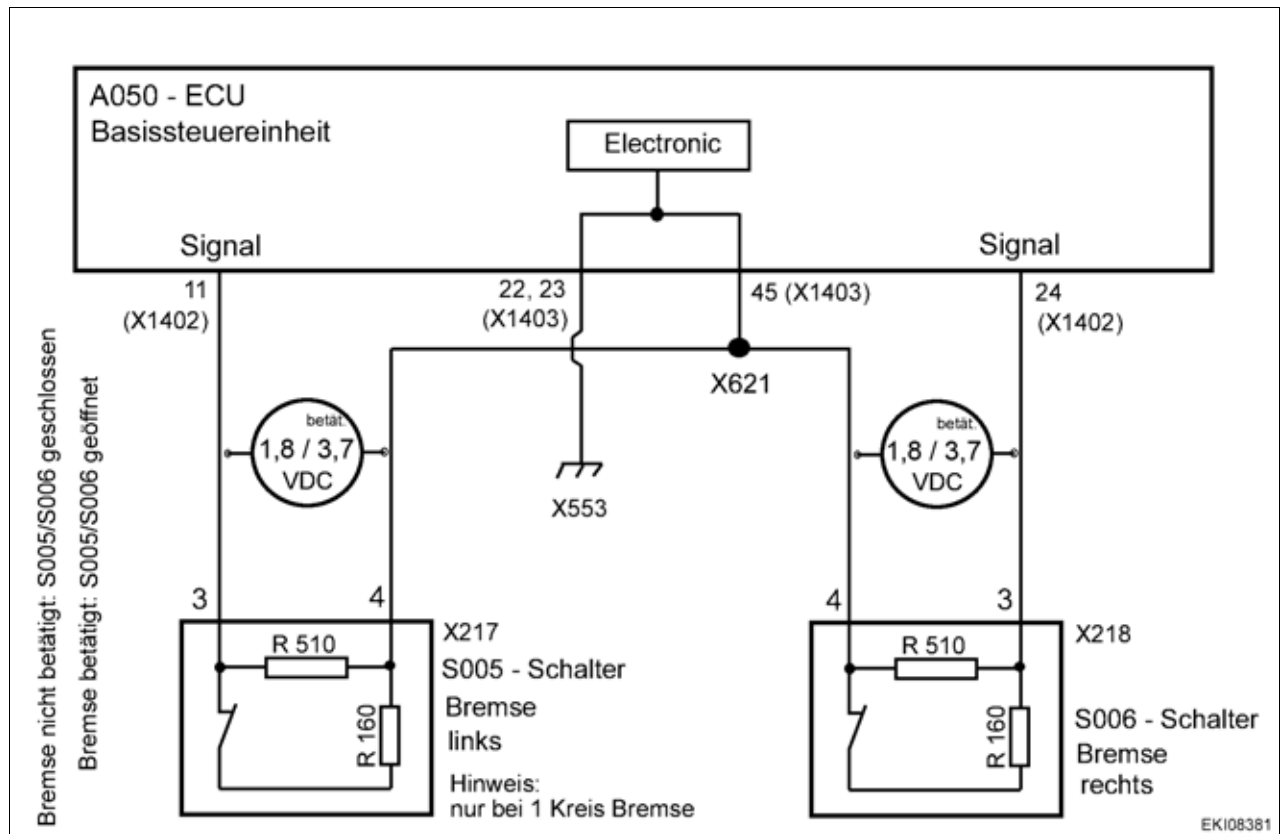
97 S005/S006 right/left brake switch**NOTE:** The **S005** - Switch, right brake is only installed on 1-circuit brake systems (2 brake pedals)

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

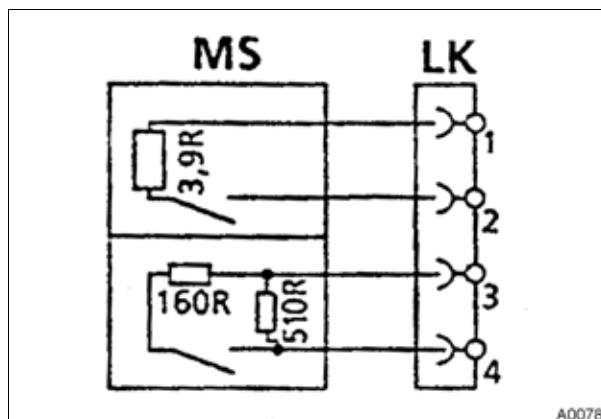


Fig. 384.

A00781
1001648

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

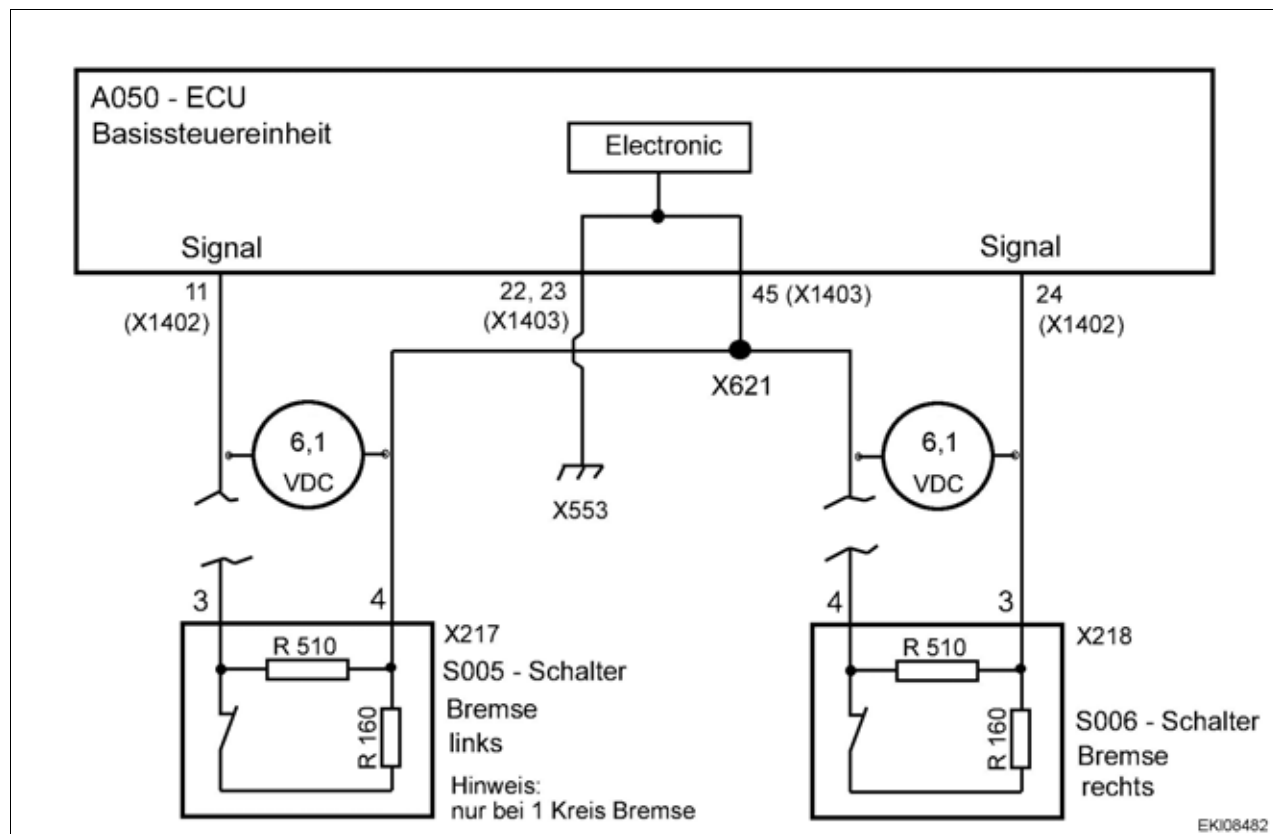


Fig. 385.

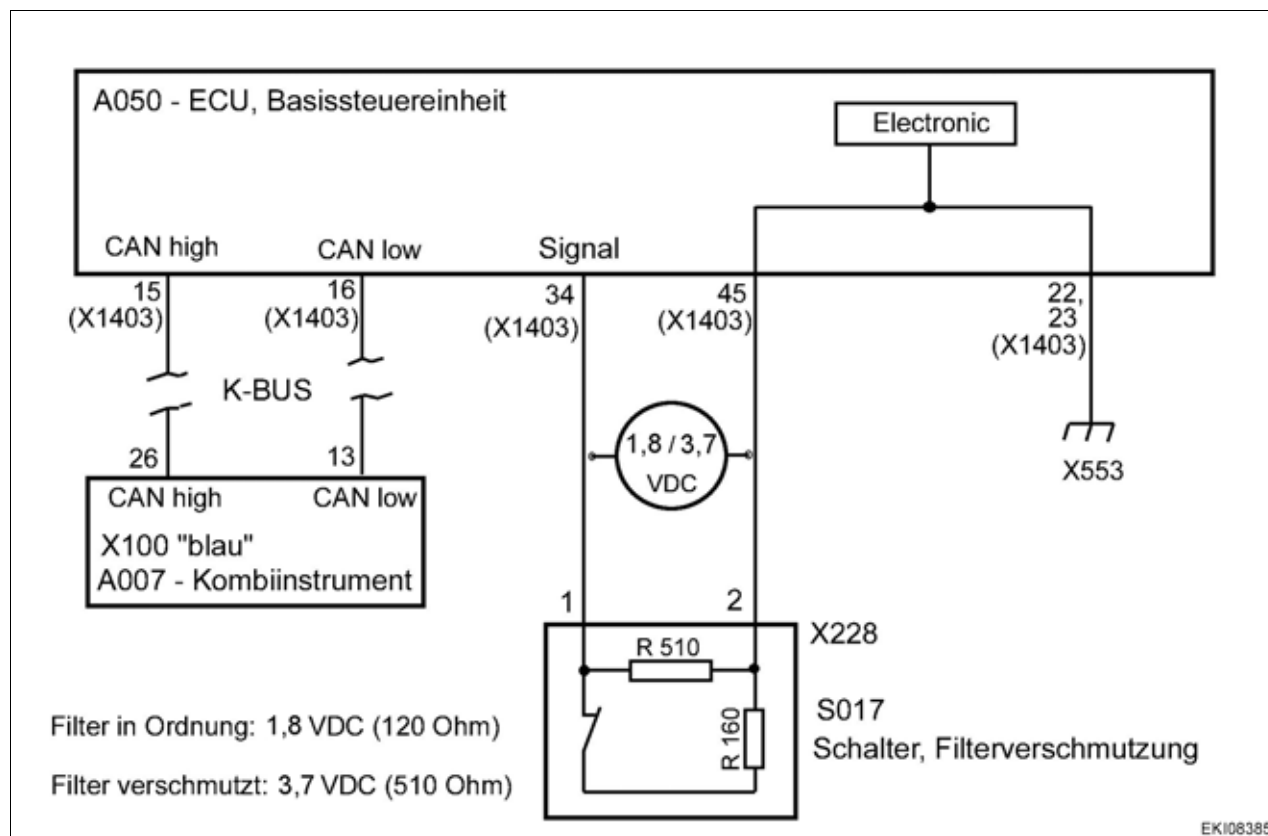


Fig. 386.

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

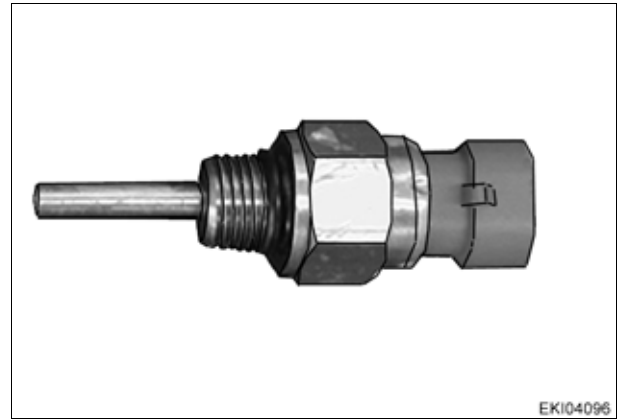


Fig. 387.

EKI04096
1000884

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 (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.

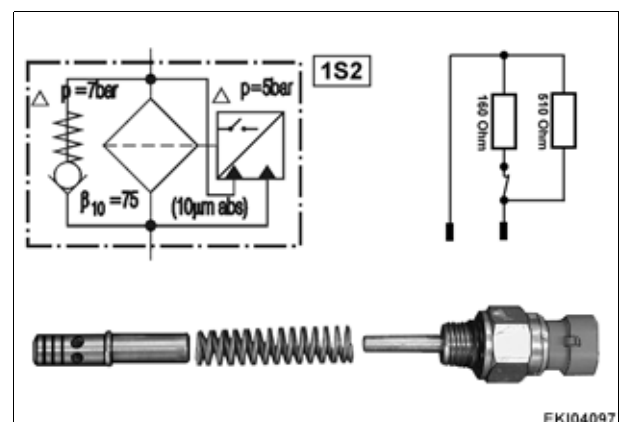


Fig. 388.

EKI04097
1000885

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.

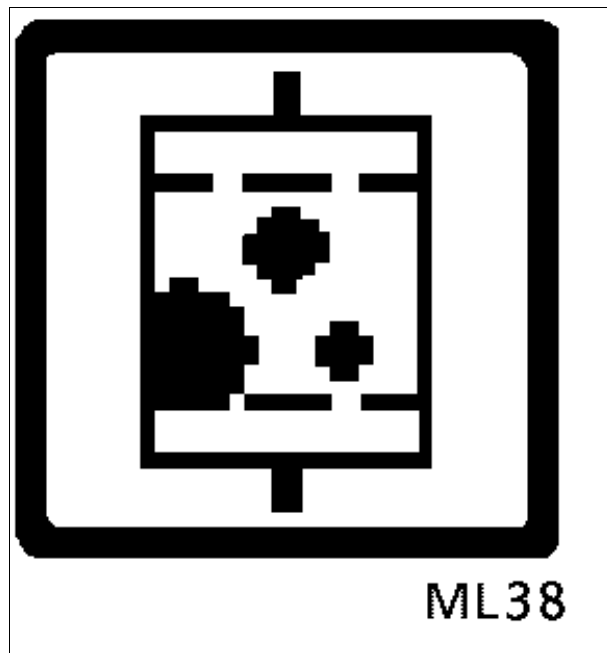


Fig. 389.

1000393

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

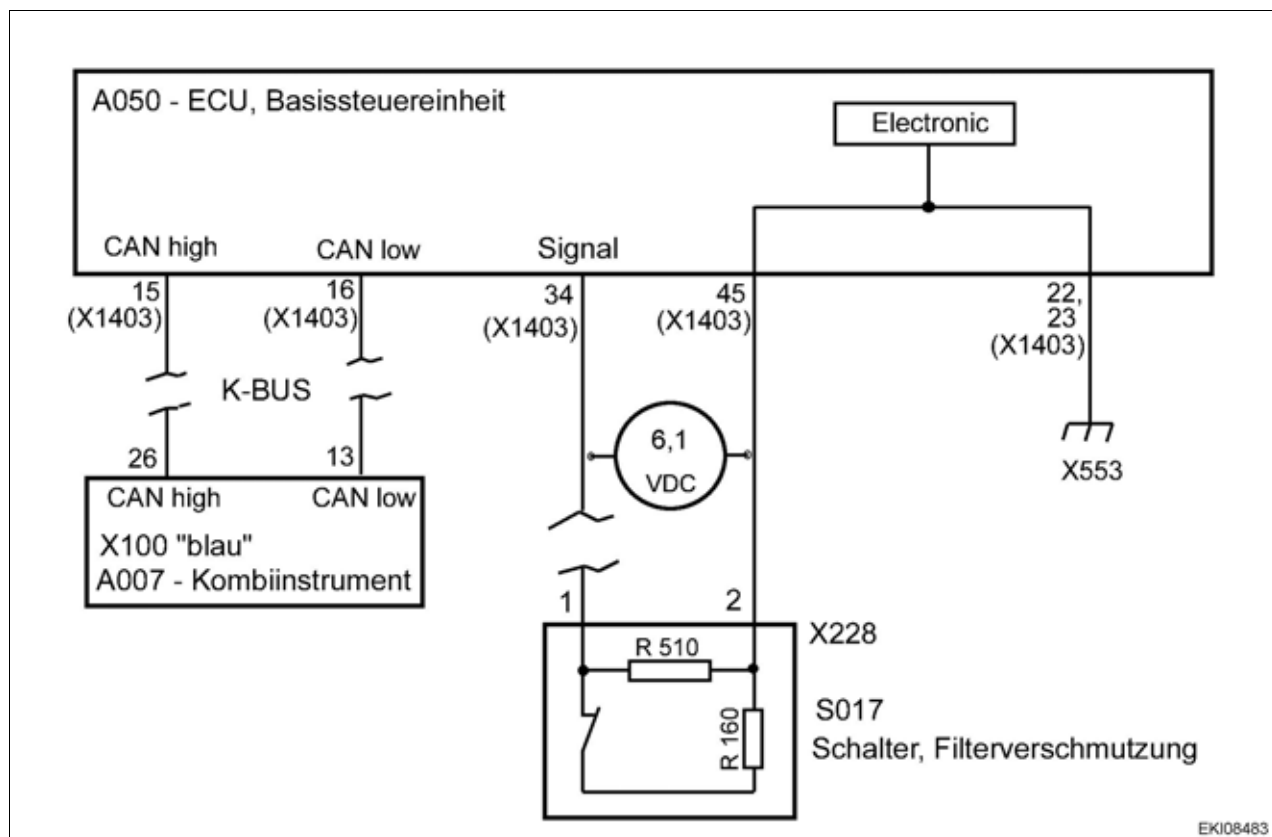
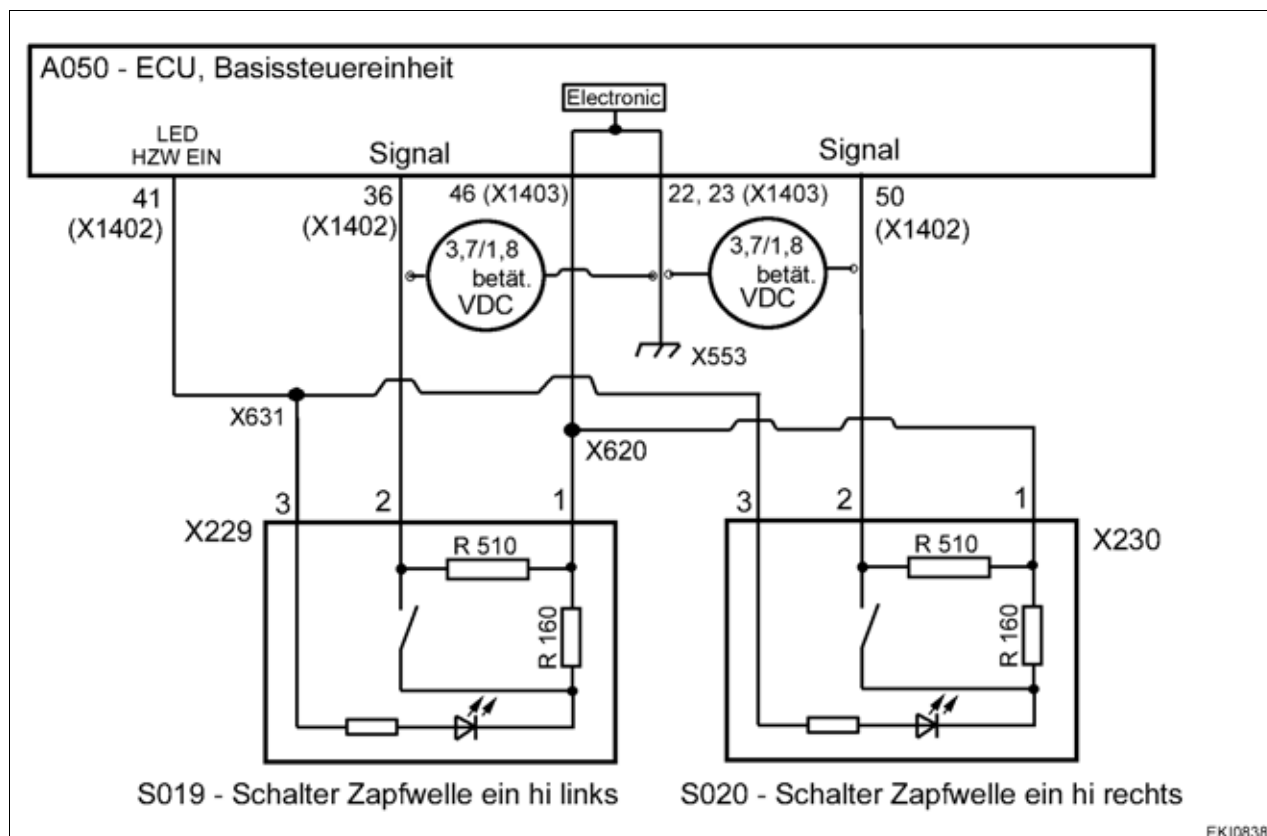


Fig. 390.

EK108483

1001988

99 S019/S020 left/right rear PTO button (external)

EKID8387

I001967

Fig. 391.

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

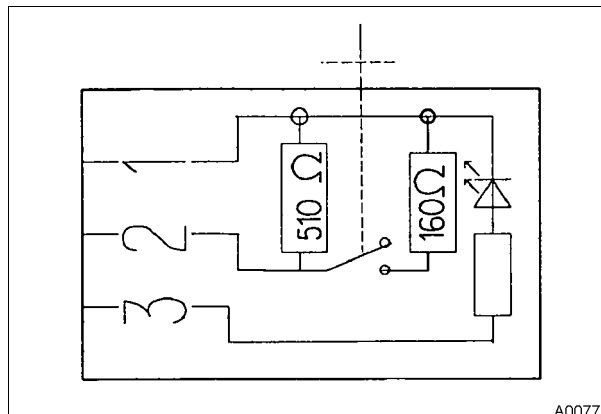


Fig. 392.

A00779
1001669

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

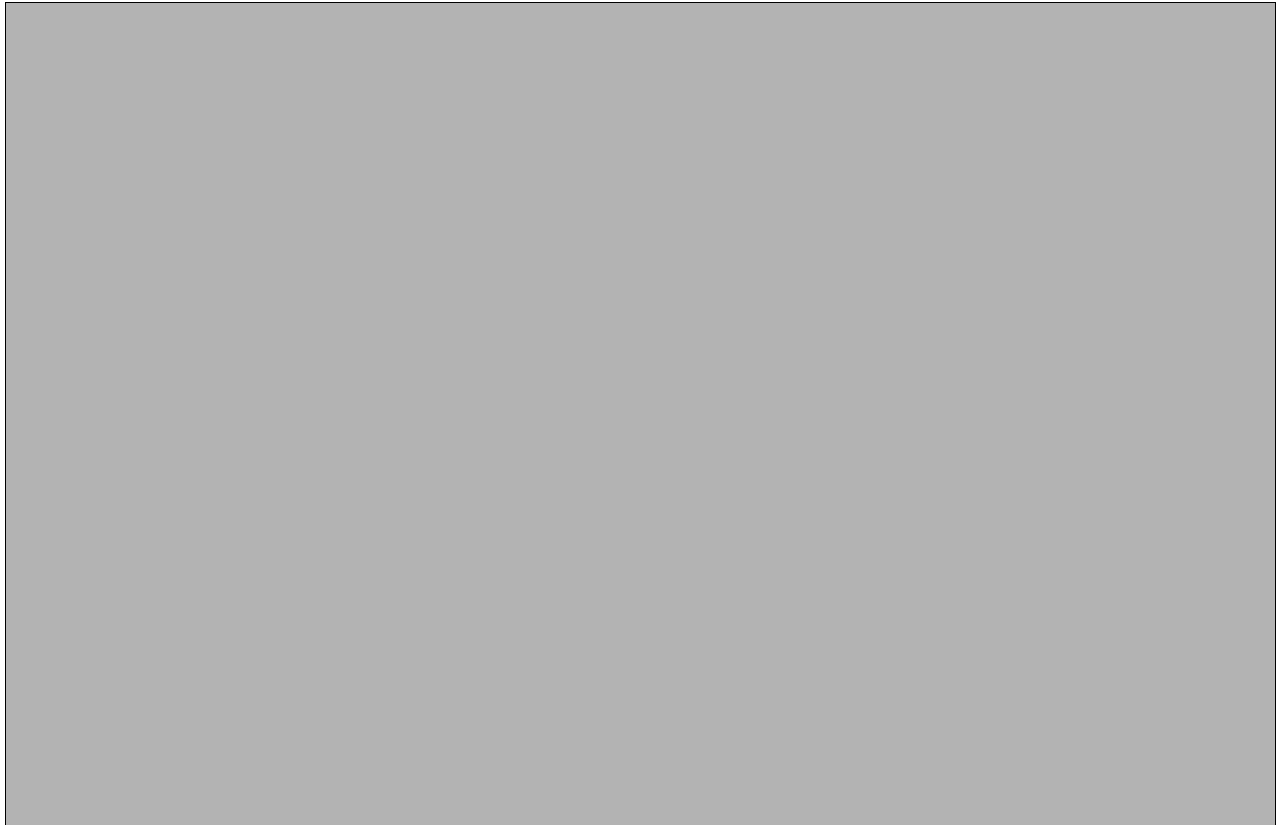


Fig. 393.

I001969

100 S021/S022 front power lift raise/lower button (external)

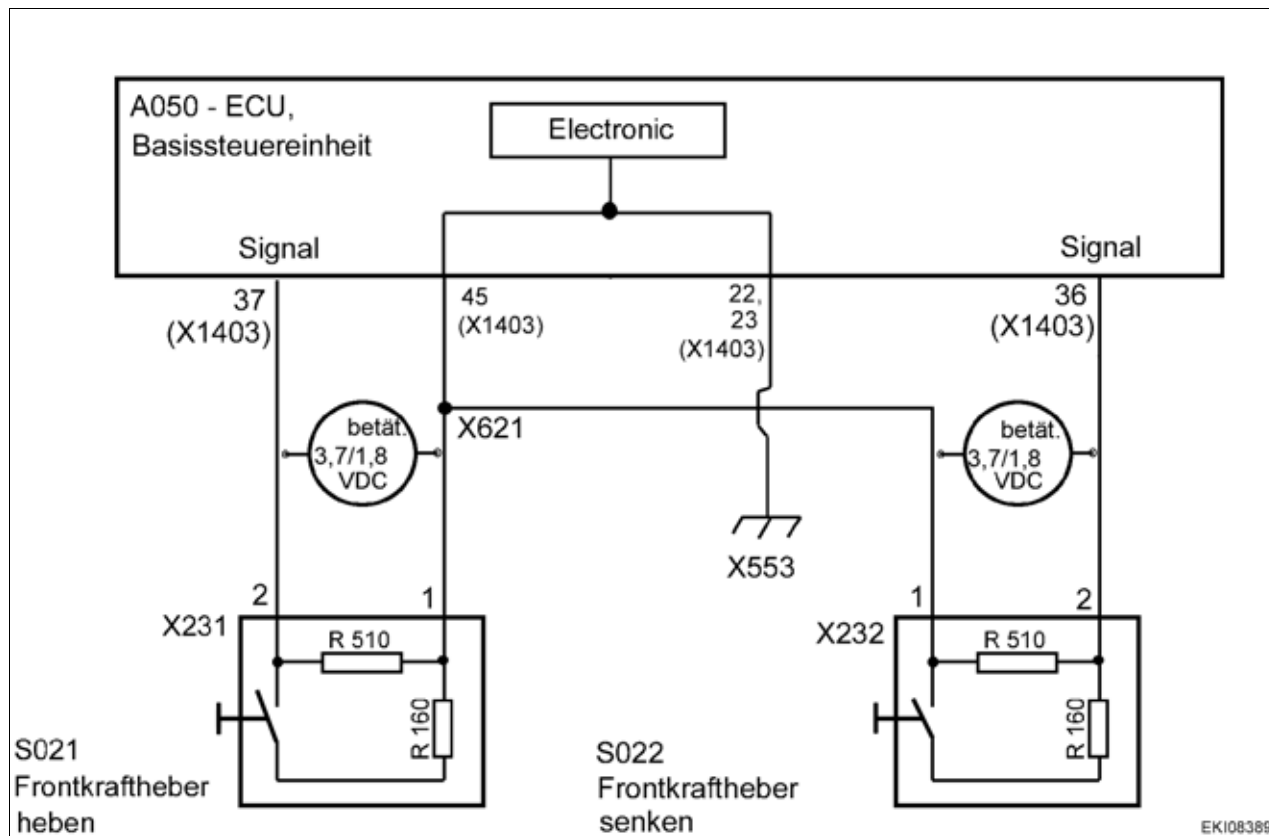


Fig. 394.

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.

EK100216
1001670**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

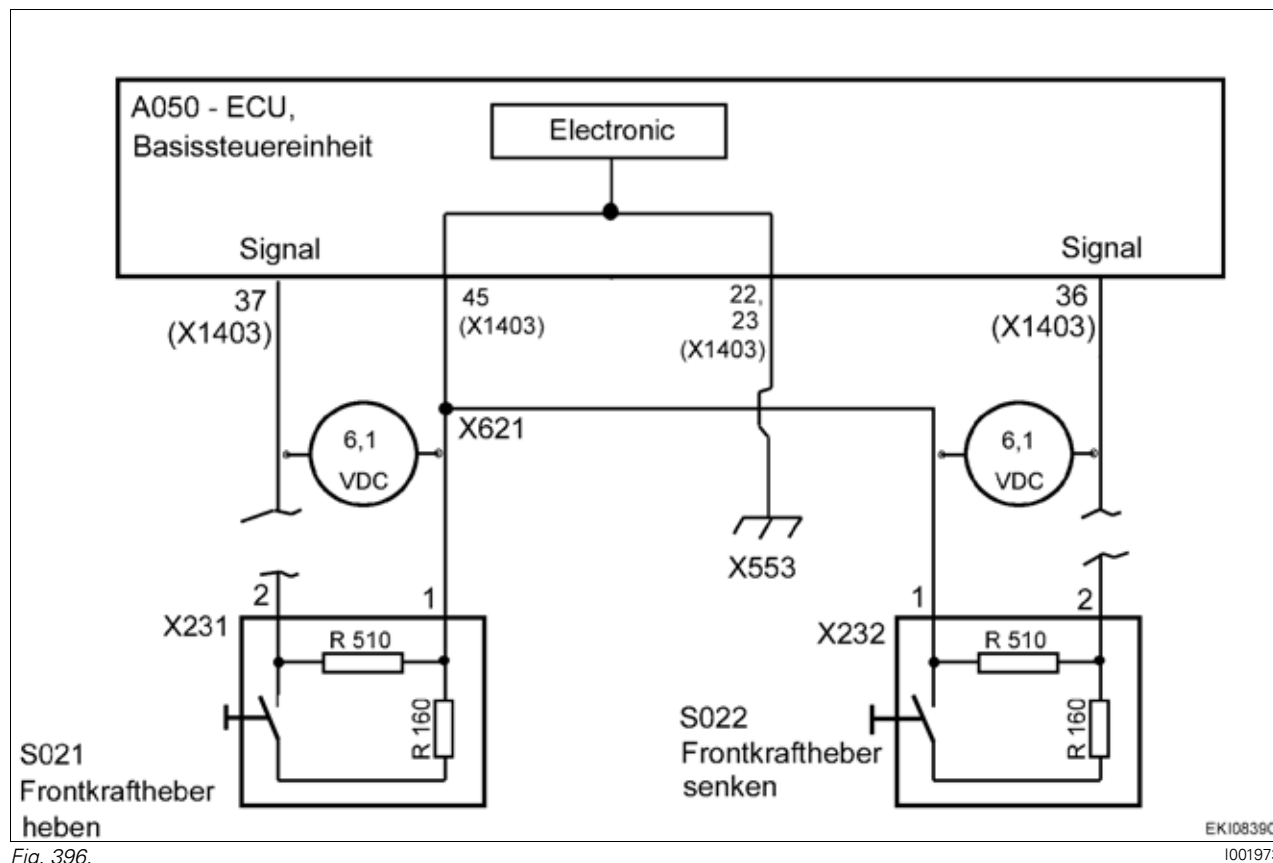


Fig. 396.

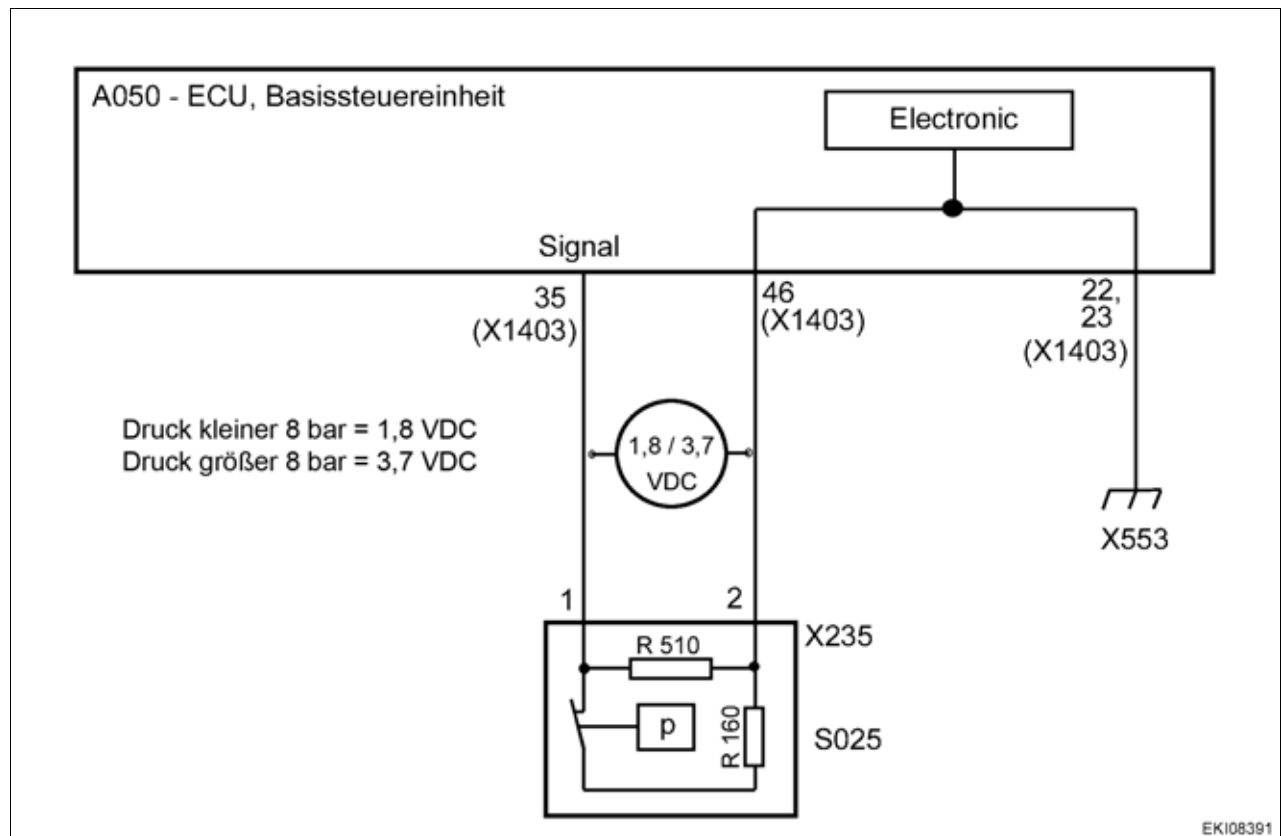
101 S025 pressure monitor control pump switch

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

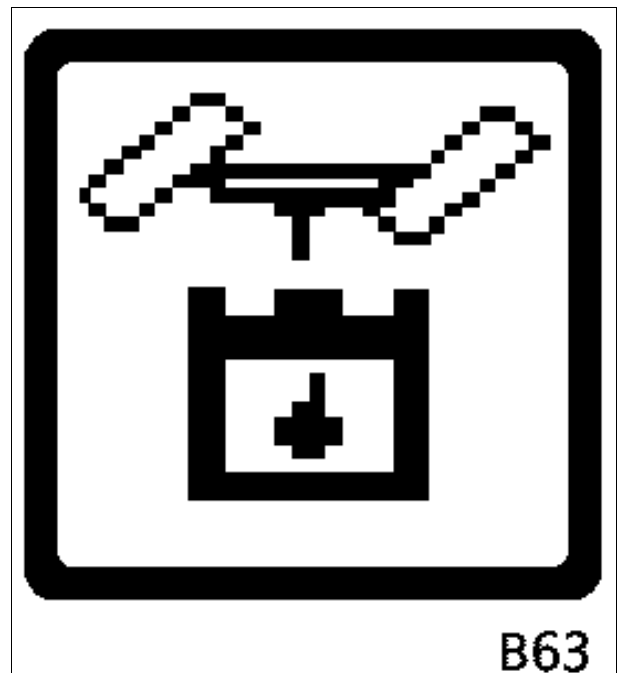


Fig. 399.

I001678

Possible cause of fault

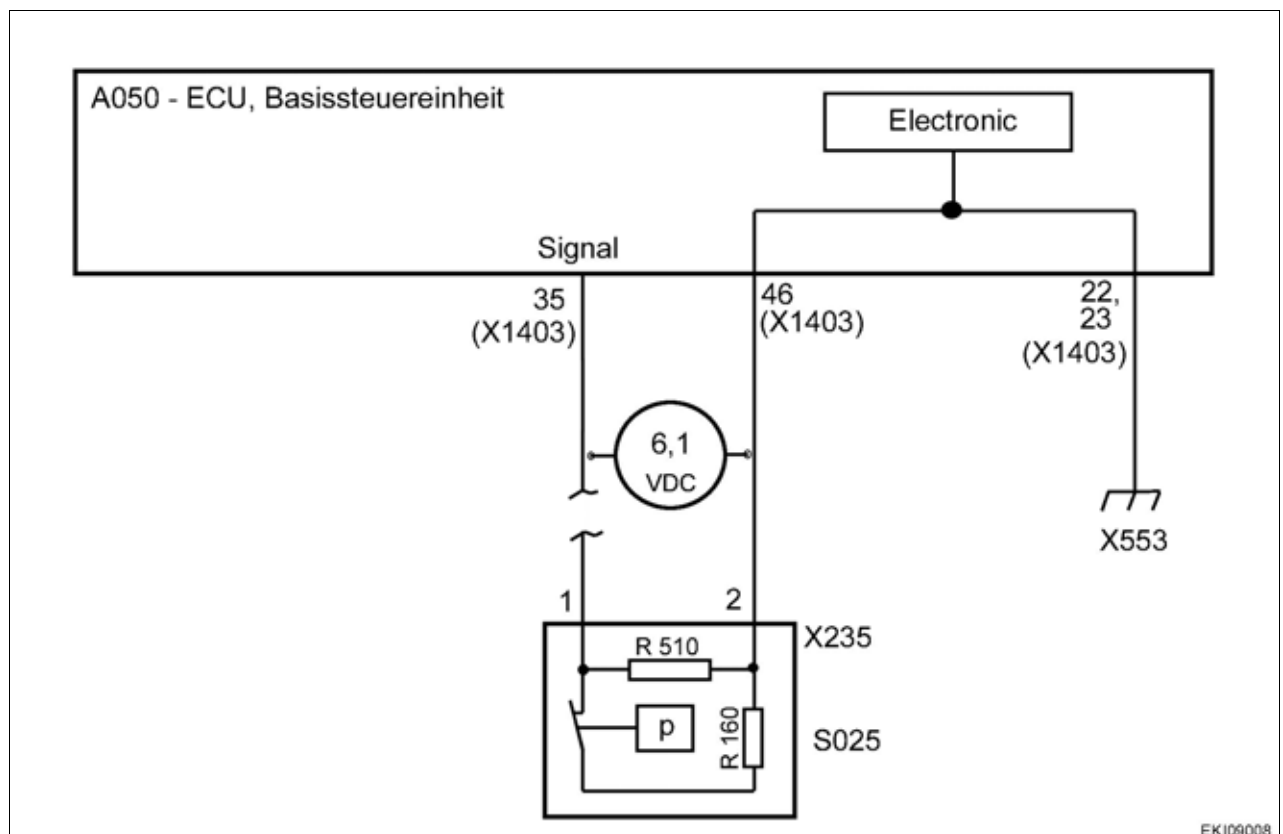


Fig. 400.

EK109008

I003568

102 S026 steering pump flow monitor switch

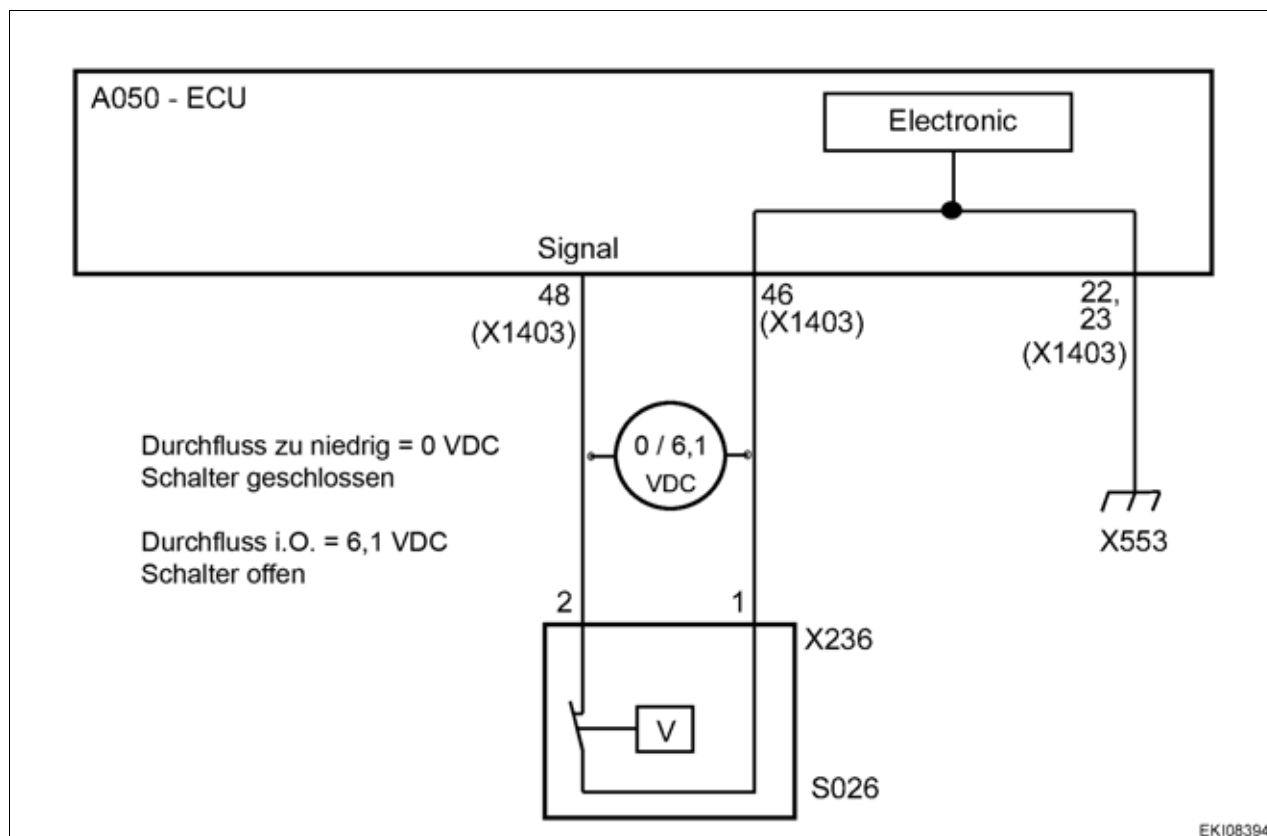


Fig. 401.

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

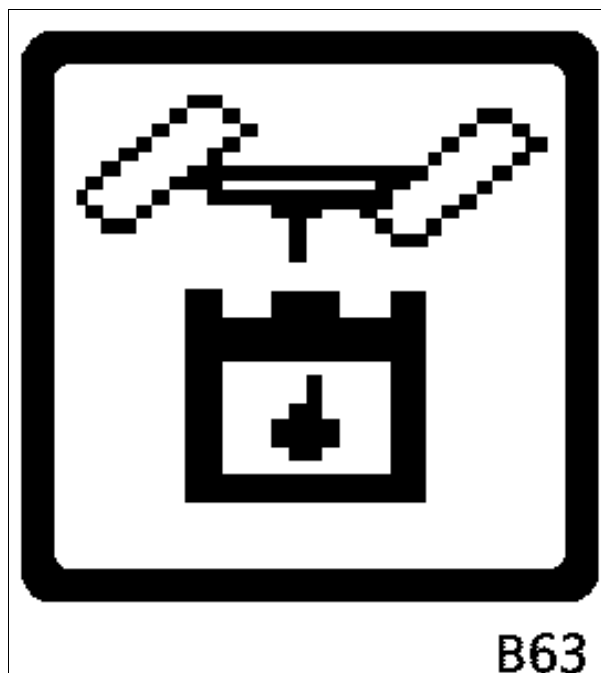


Fig. 403.

I001678

Possible cause of fault

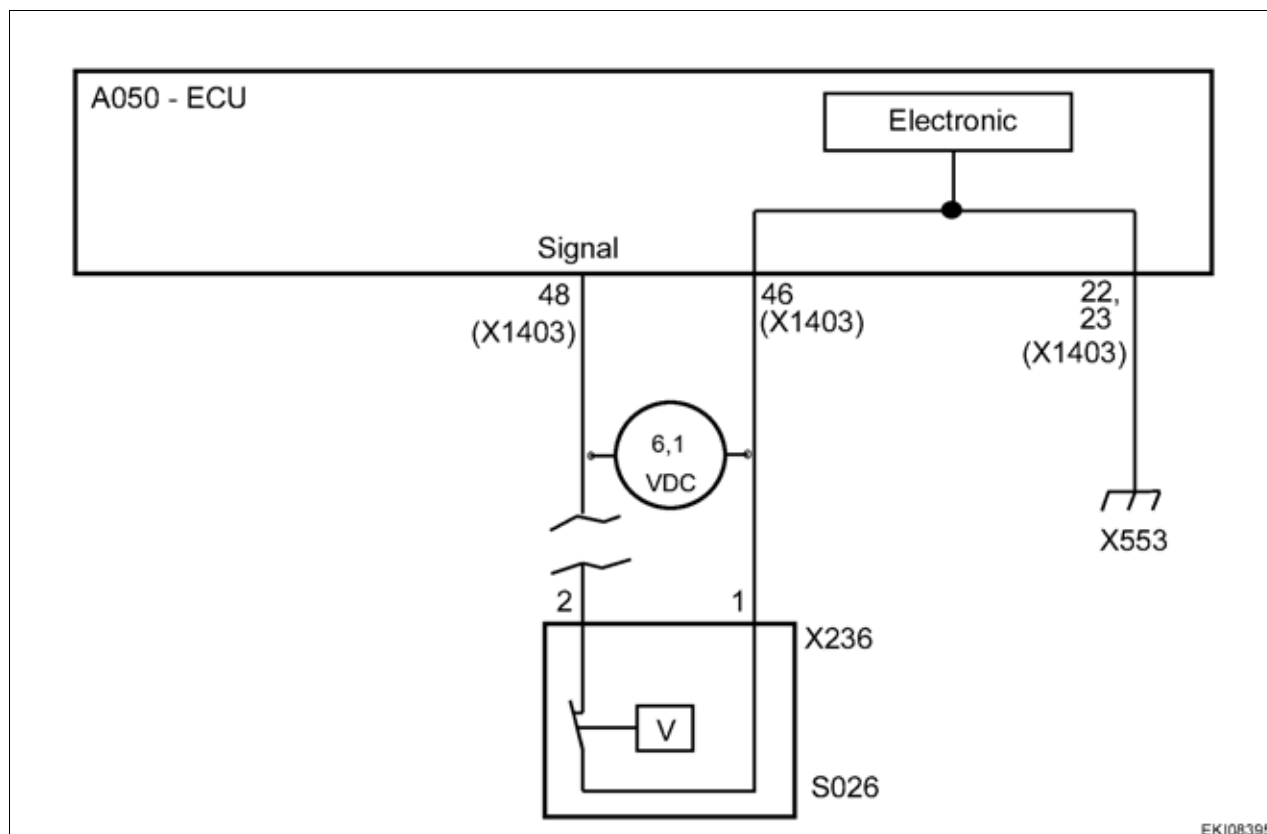


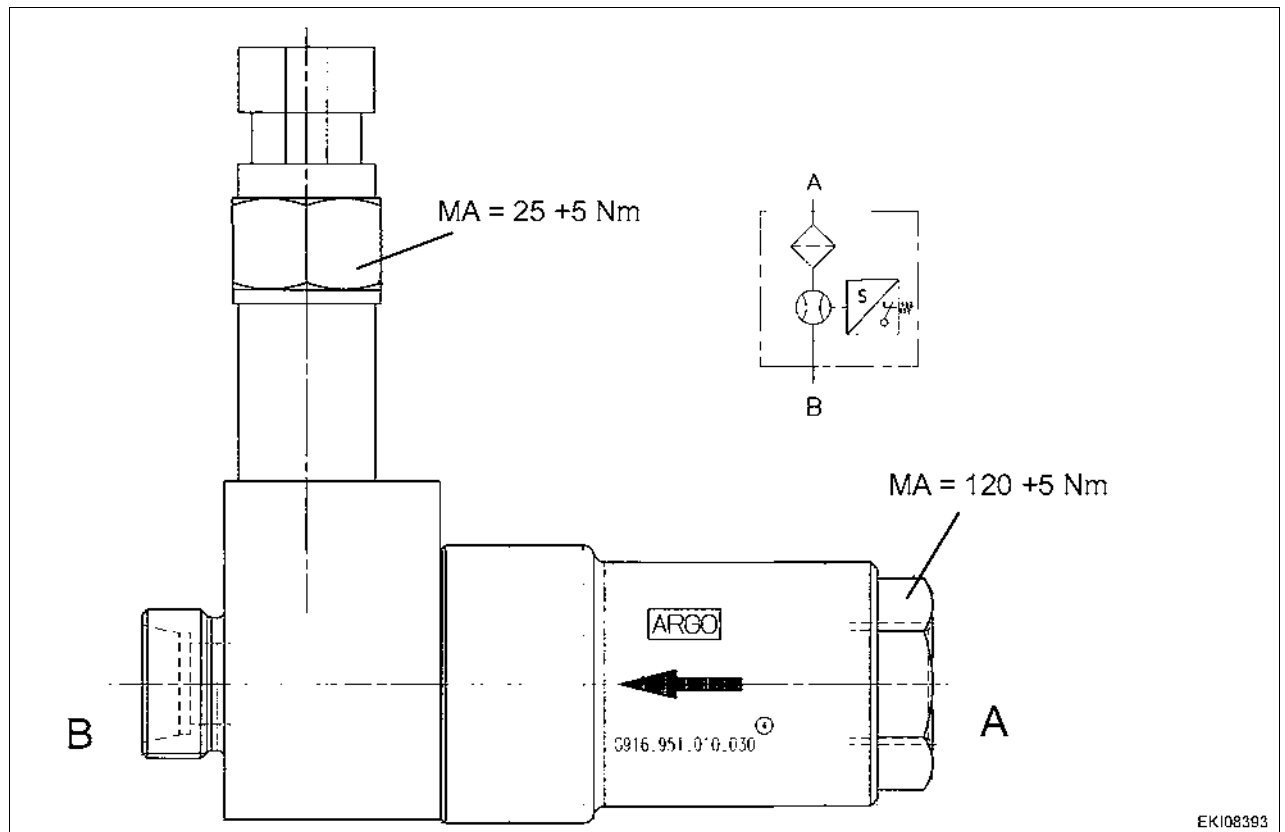
Fig. 404.

EK108395

I001975

Flow direction and torque values at S026 flow monitor

NOTE: The S026 flow monitor can only be supplied as a complete unit.



EK108393

Fig. 405.

1001677

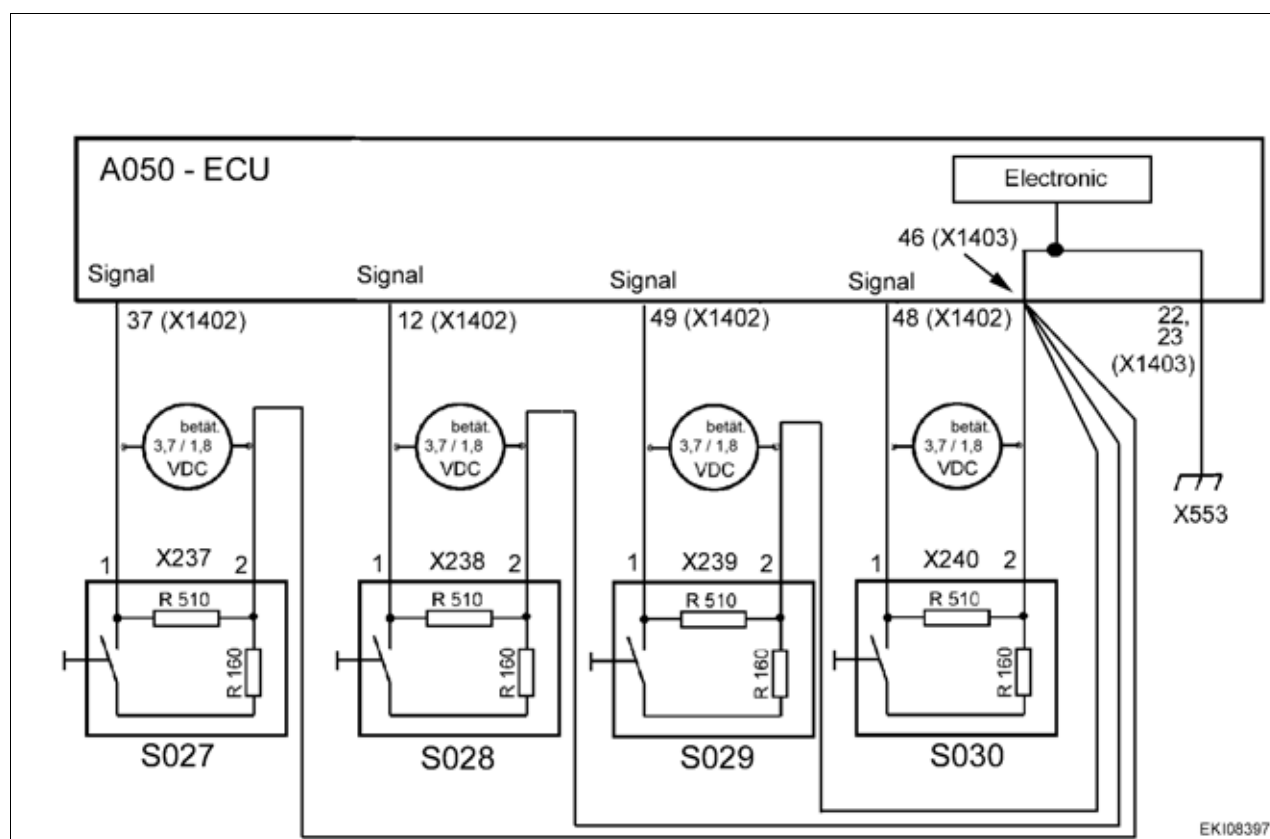
103 S027/S028/S029/S030 rear power lift button (external)

Fig. 406.

EK108397

1001976

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.

FK100216
1001670

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

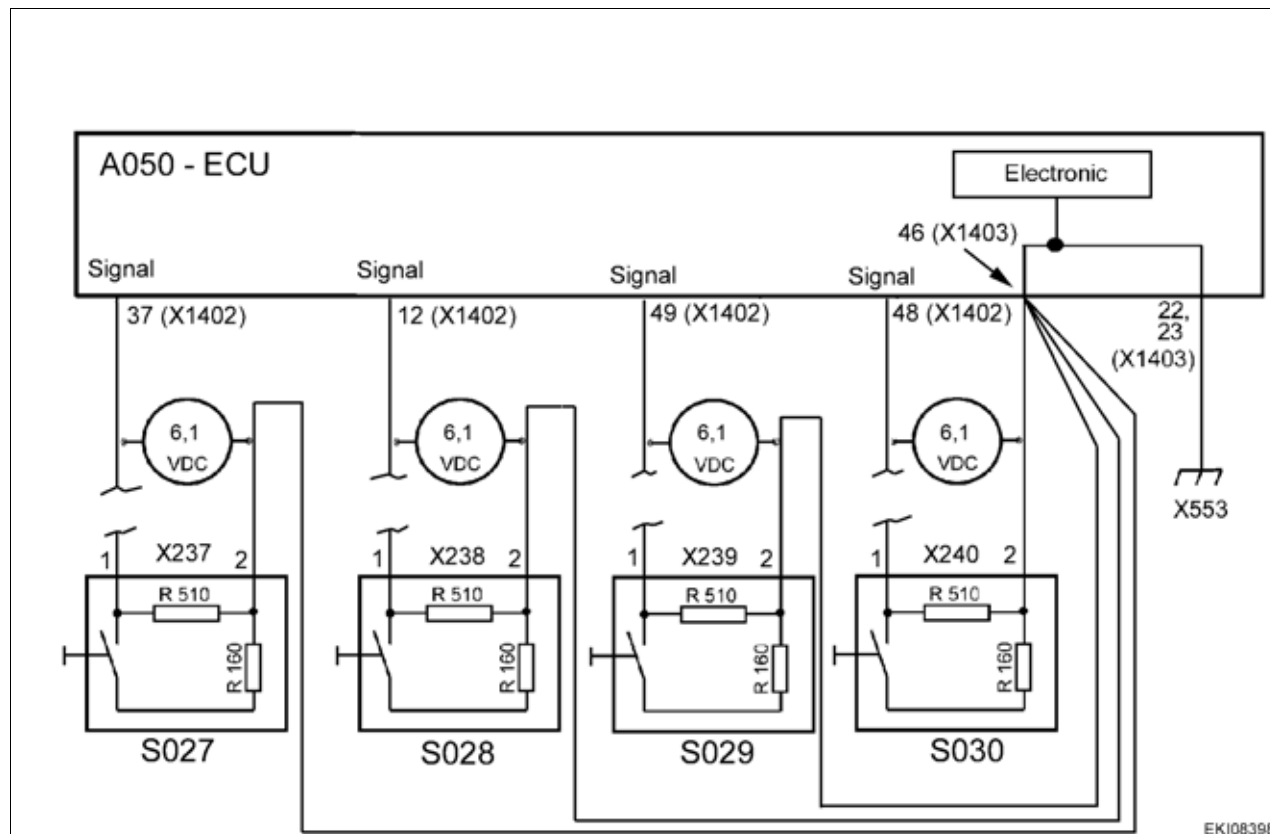


Fig. 408.

EK108398

1001977

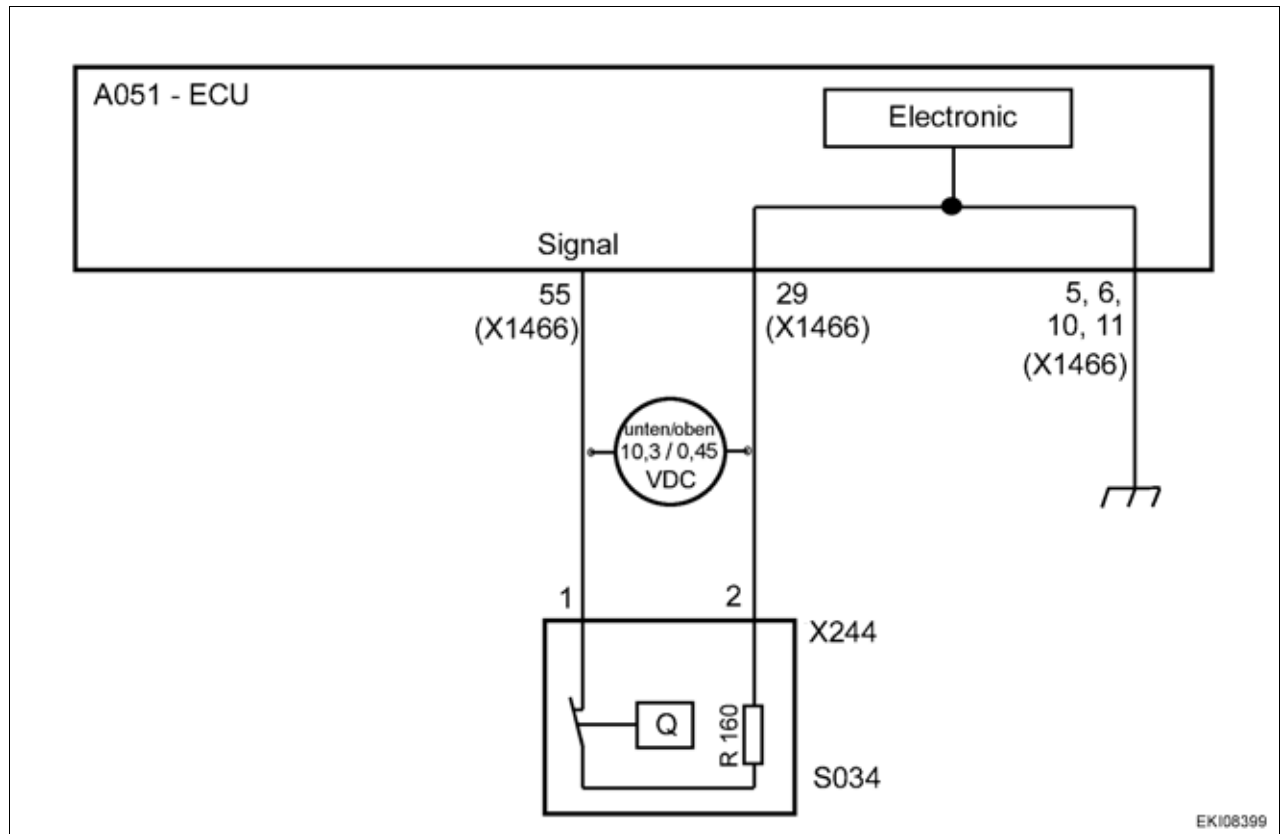
104 S034 coolant level switch

Fig. 409.

EKI08399

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.

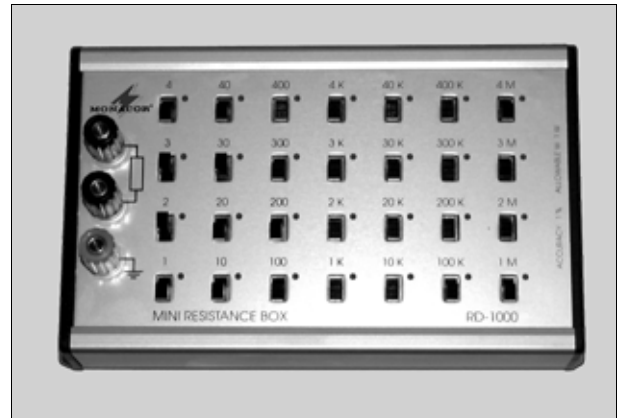


Fig. 412.

I000639

Warning message: coolant below required level

NOTE: Allow preconditioning time.

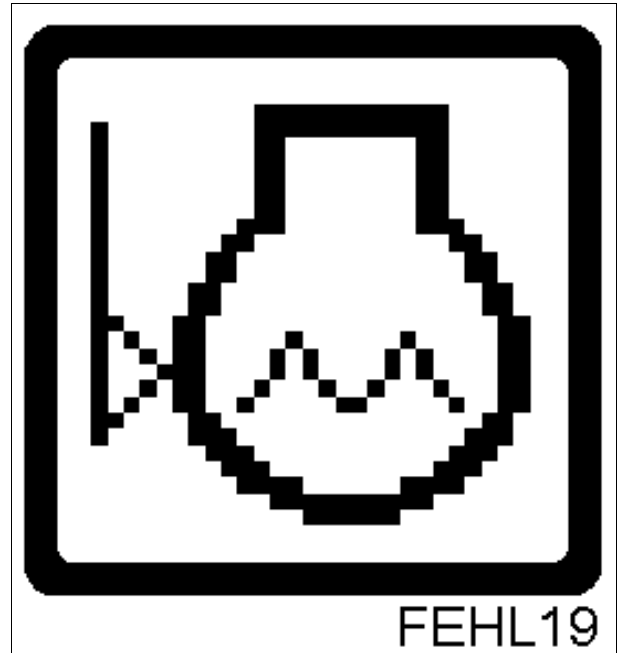


Fig. 413.

I000413

105 S045 switch, reverse operation positioning

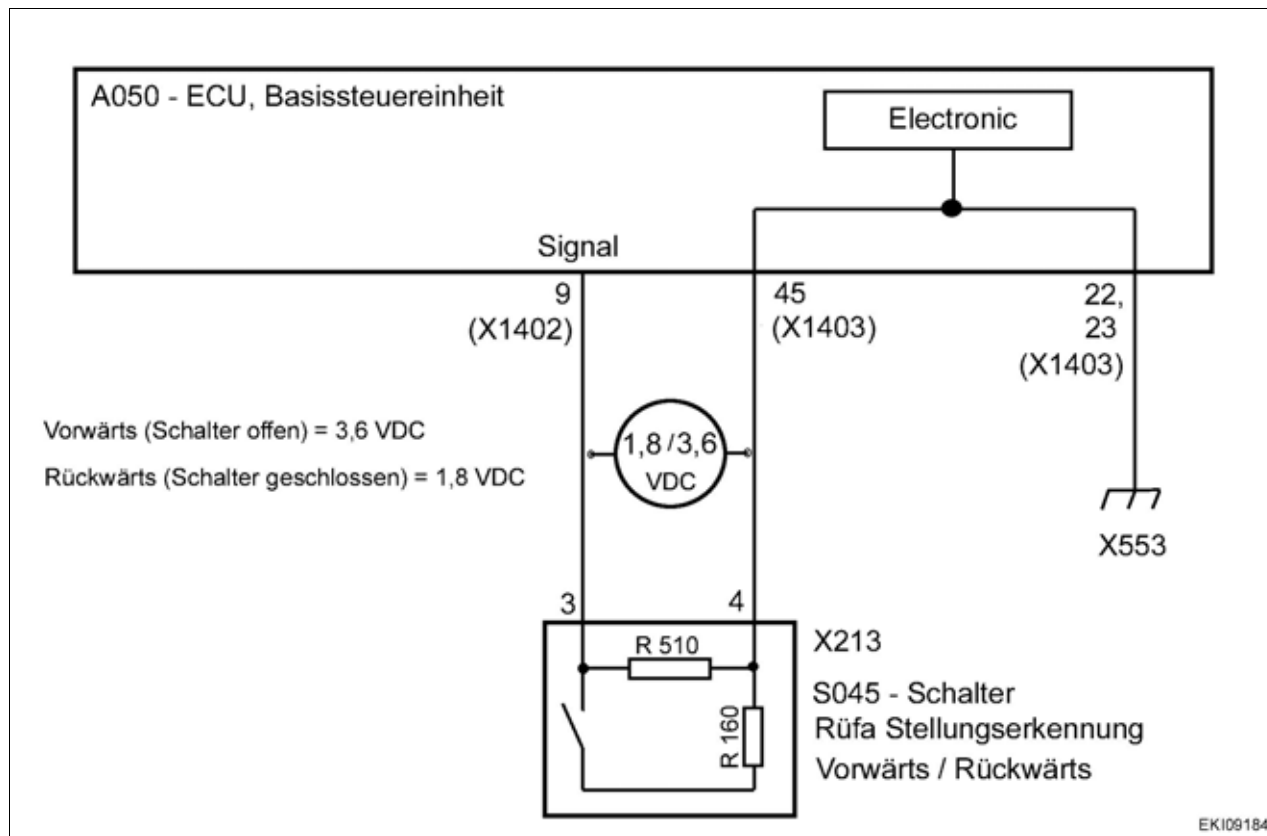


Fig. 414.

1004831

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

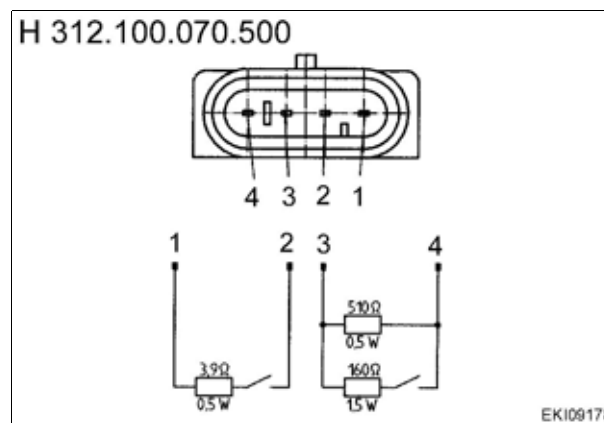


Fig. 415.

1004821

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%.

Pin	description	Signal type/condition	Signal	Break in wiring	
				Signal from ECU	Signal from component
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

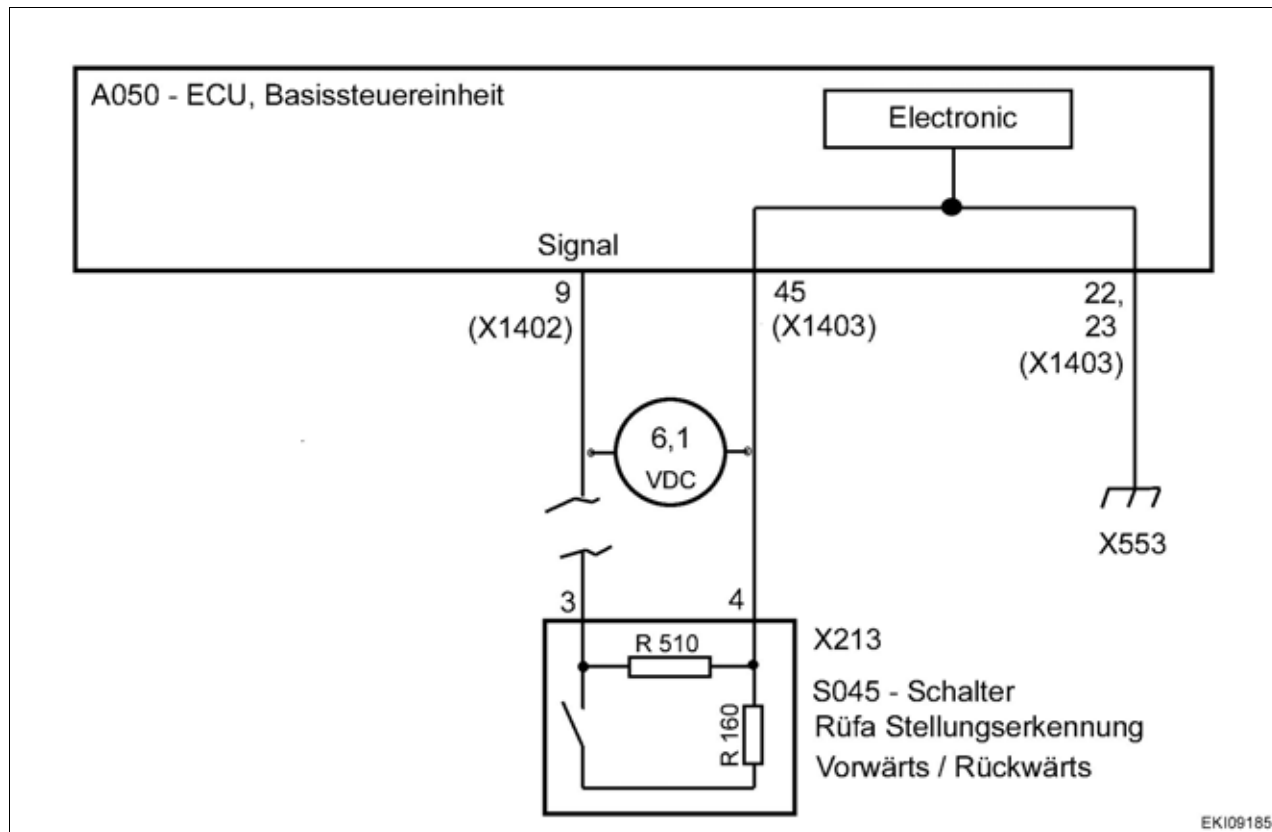


Fig. 416.

EKI09185

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.

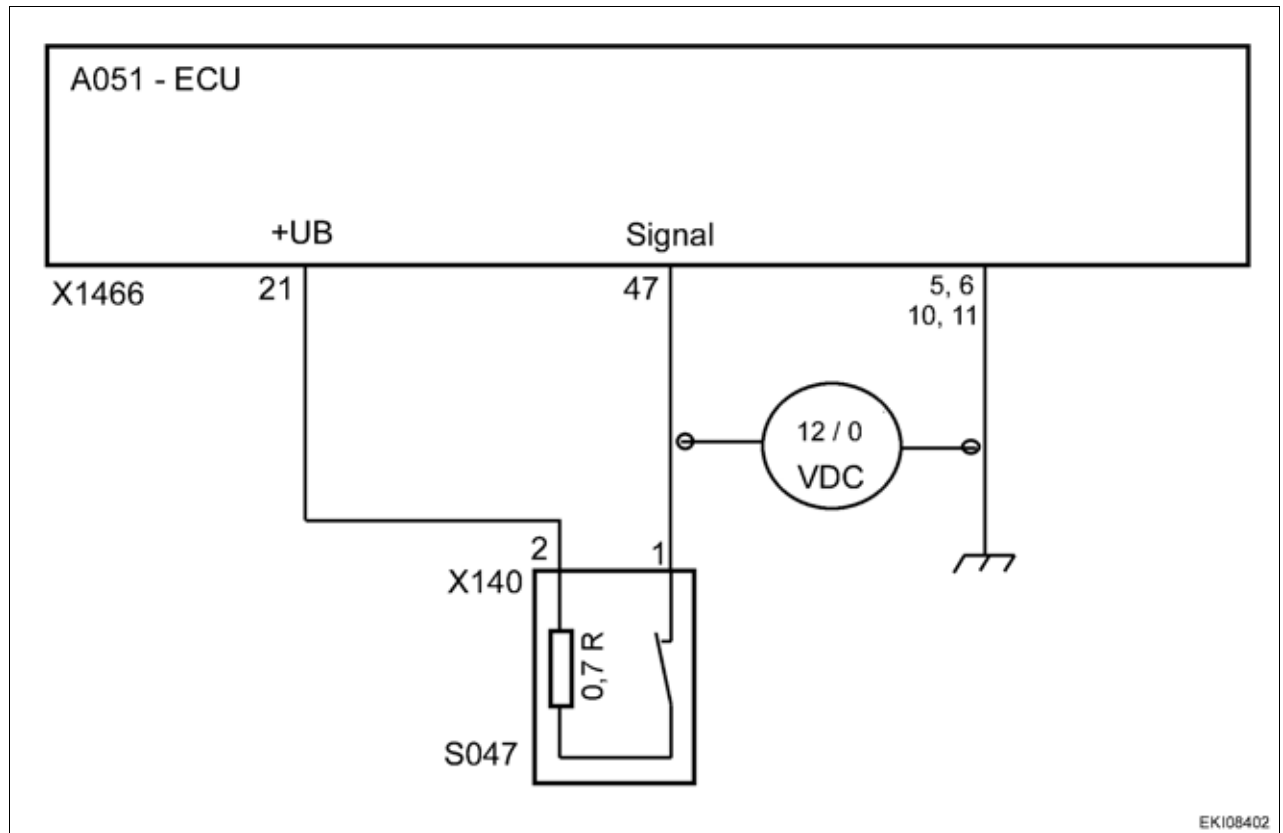


Fig. 417.

EK108402

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.

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

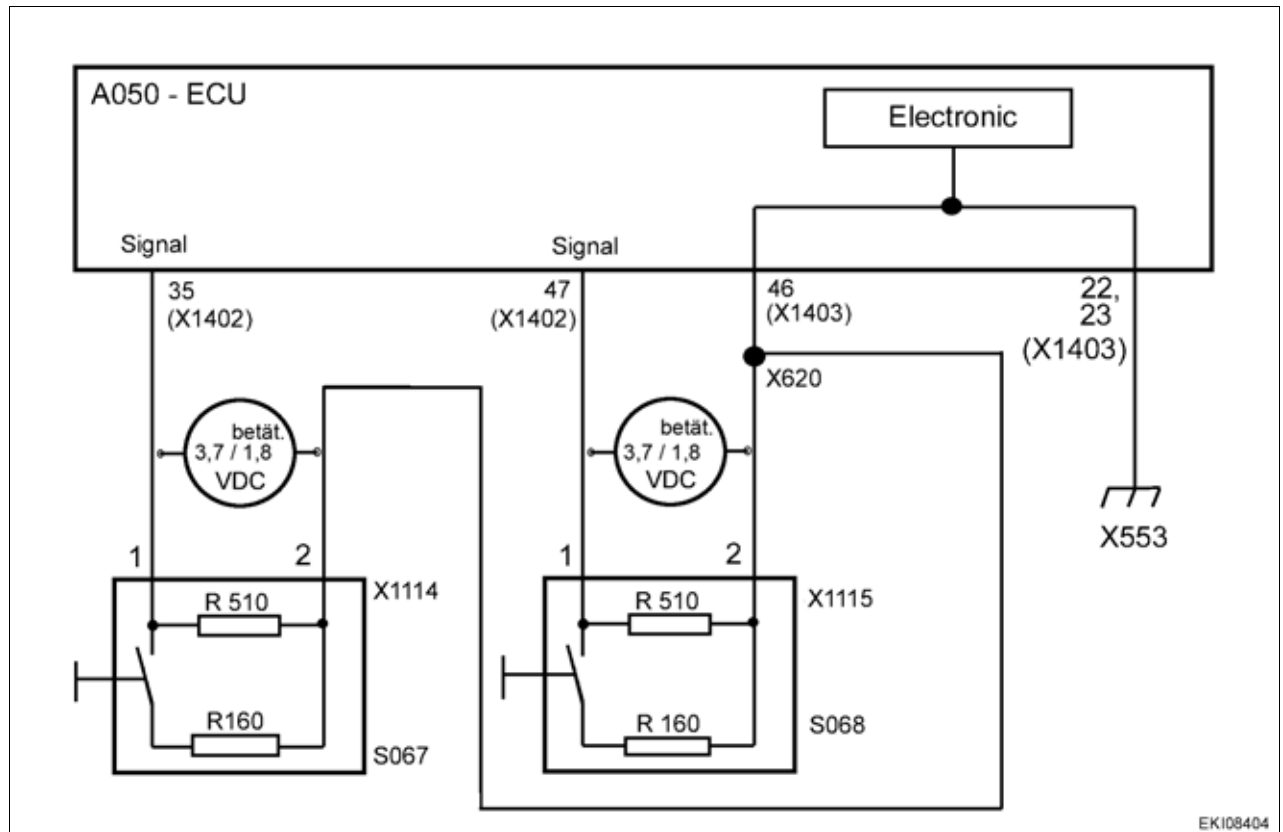
107 S067/S068 button, valve actuation raise/lower (external)

Fig. 419.

EKI08404

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

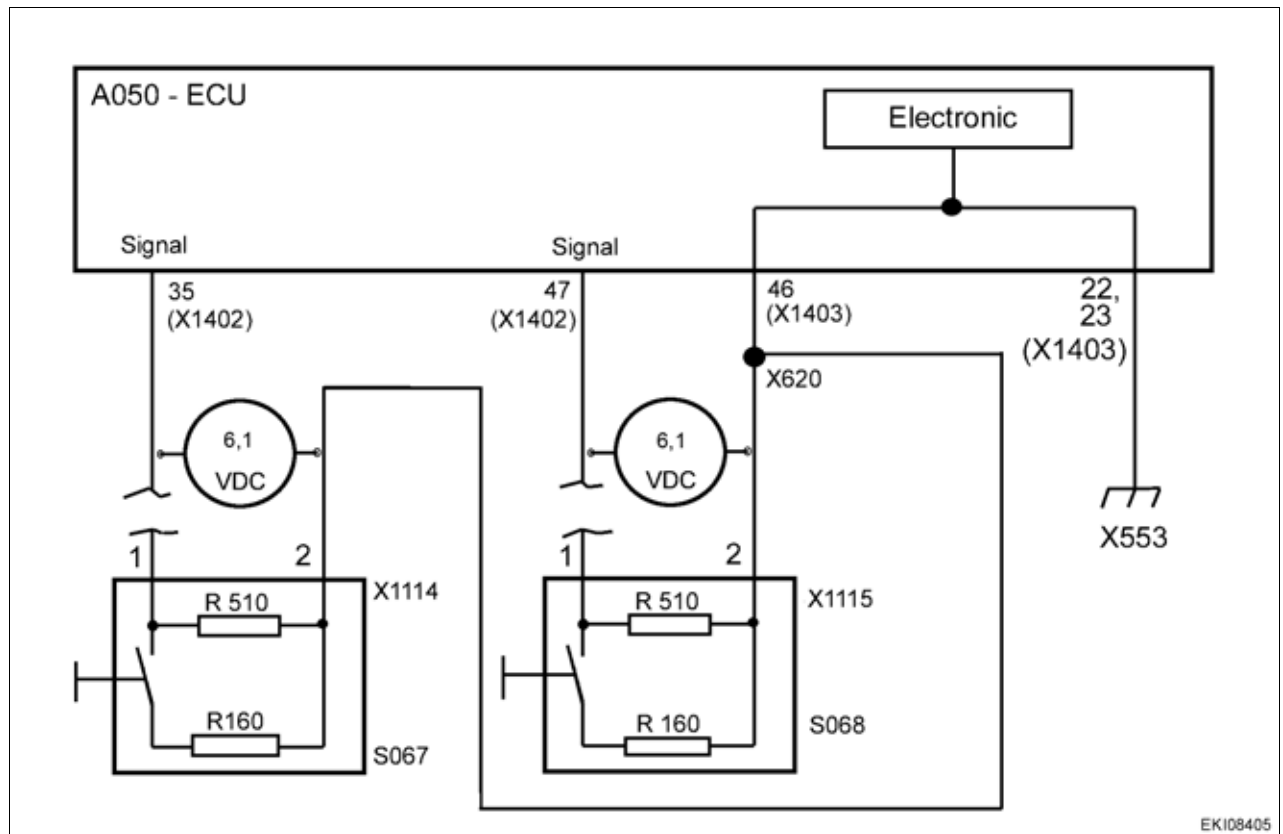
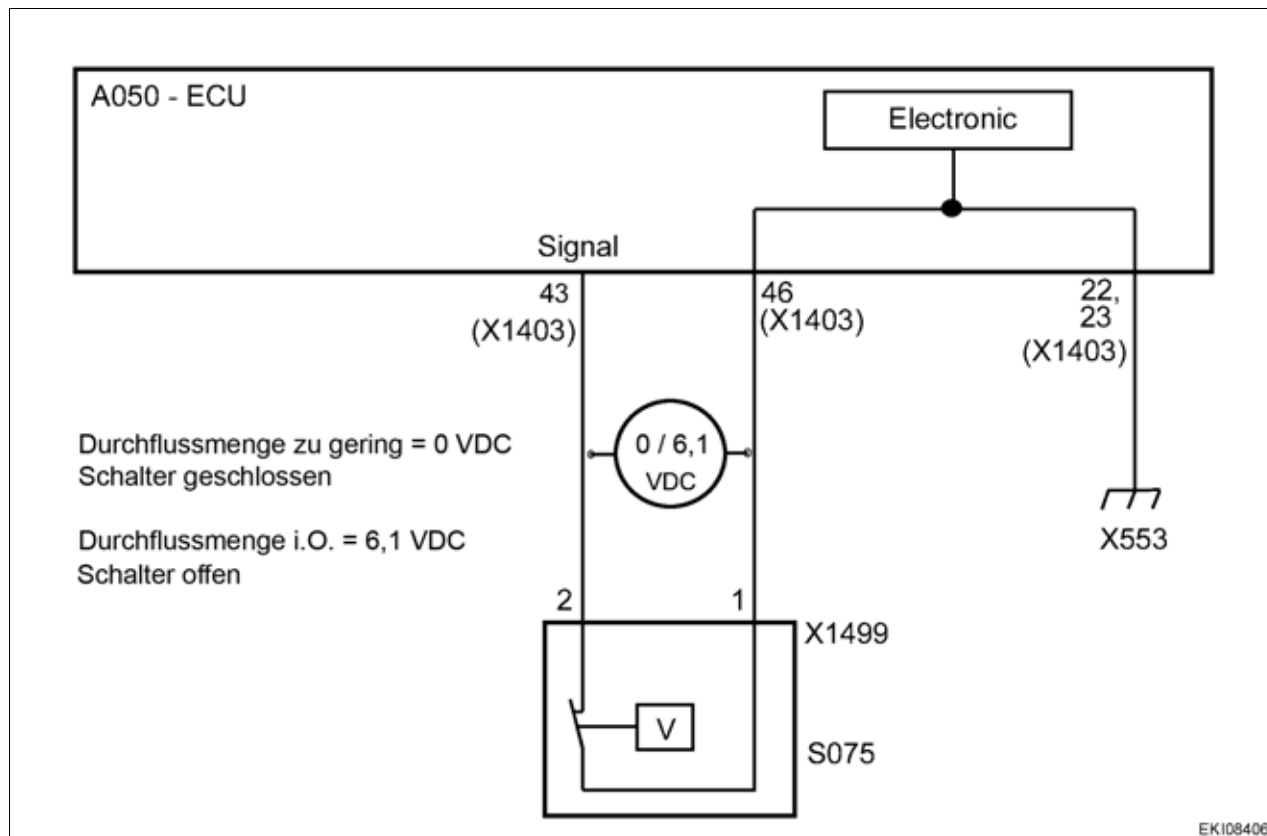


Fig. 421.

EK108405

I001979

108 S075 switch, guard rail pump flow monitor



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

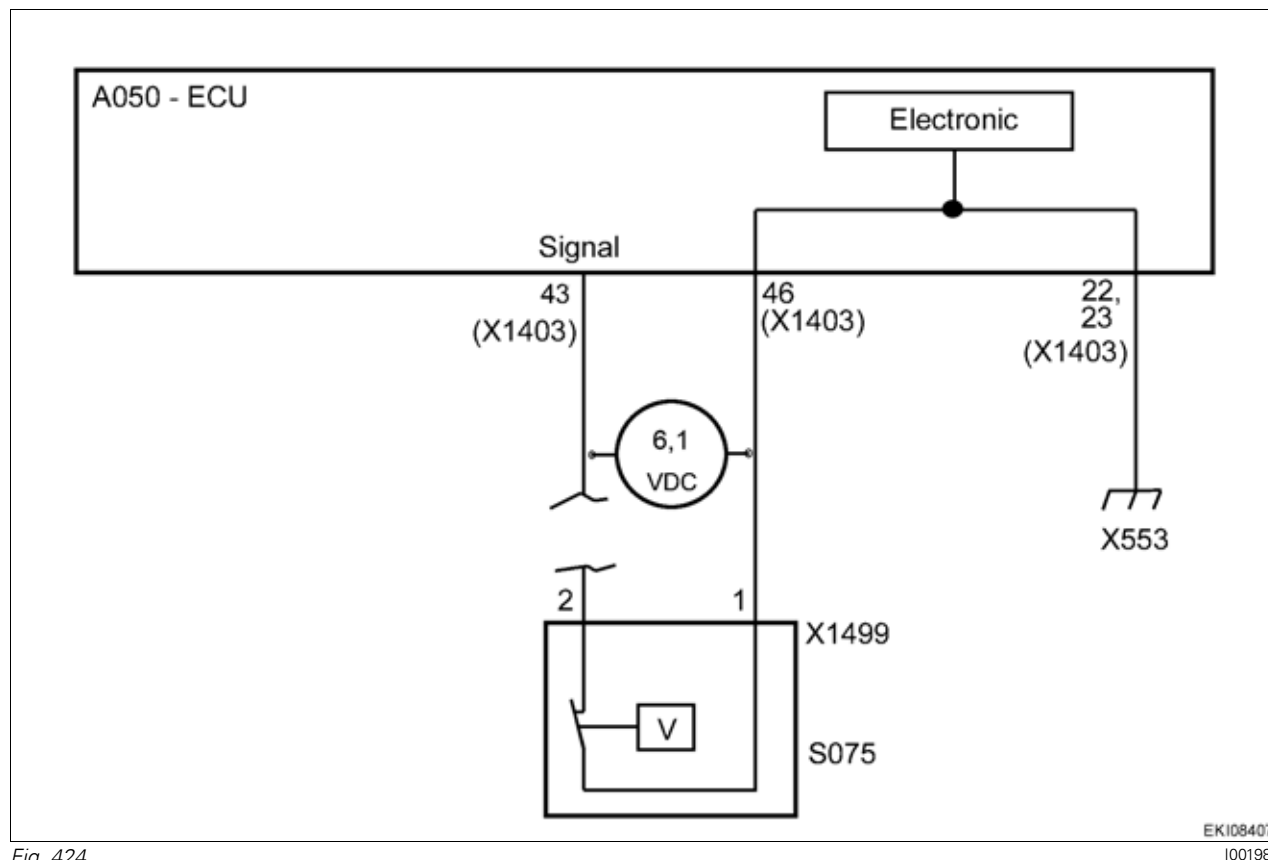


Fig. 424.

1001981

Flow direction and torque values at S075 flow monitor

NOTE: The S075 flow monitor can only be supplied as a complete unit.

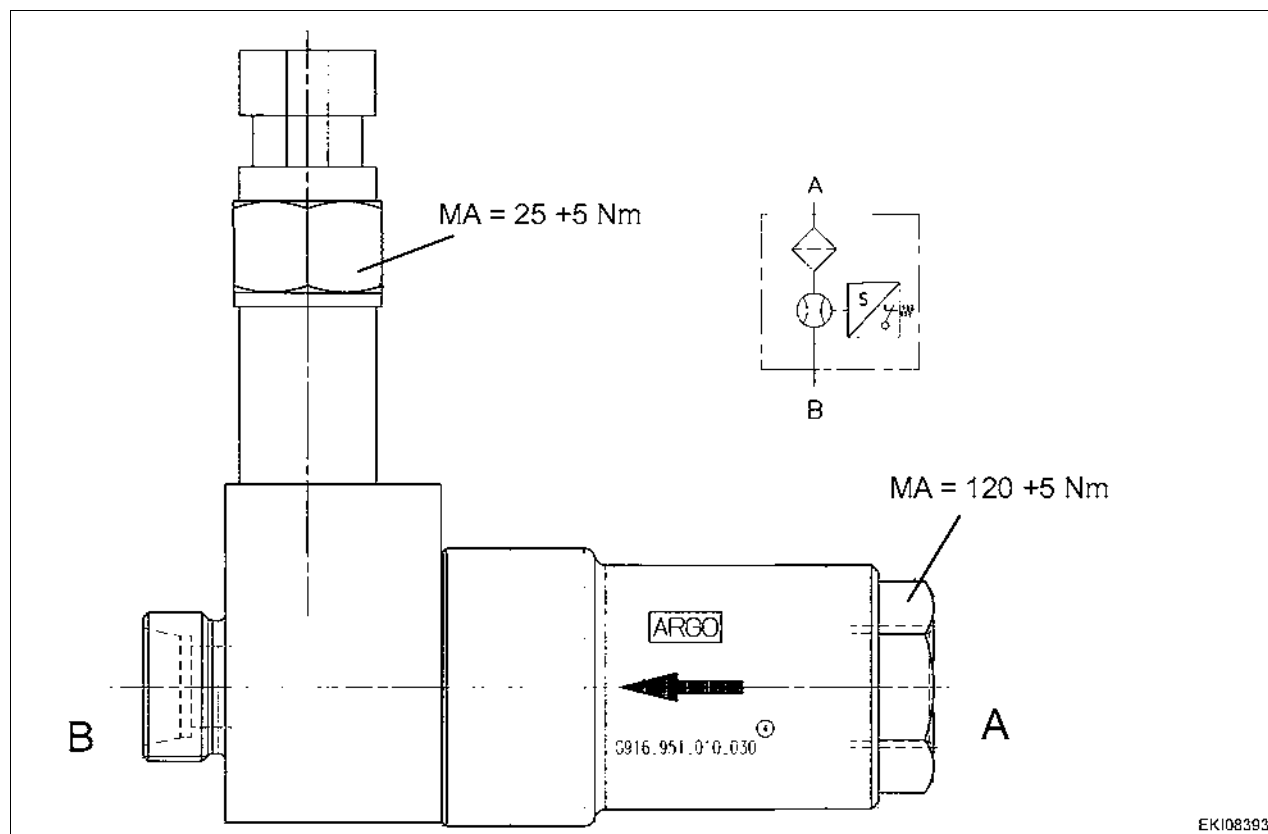


Fig. 425.

1001677

109 S079 steering column/quick reverse switch (area: quick reverse)

Circuit diagram: quick reverse

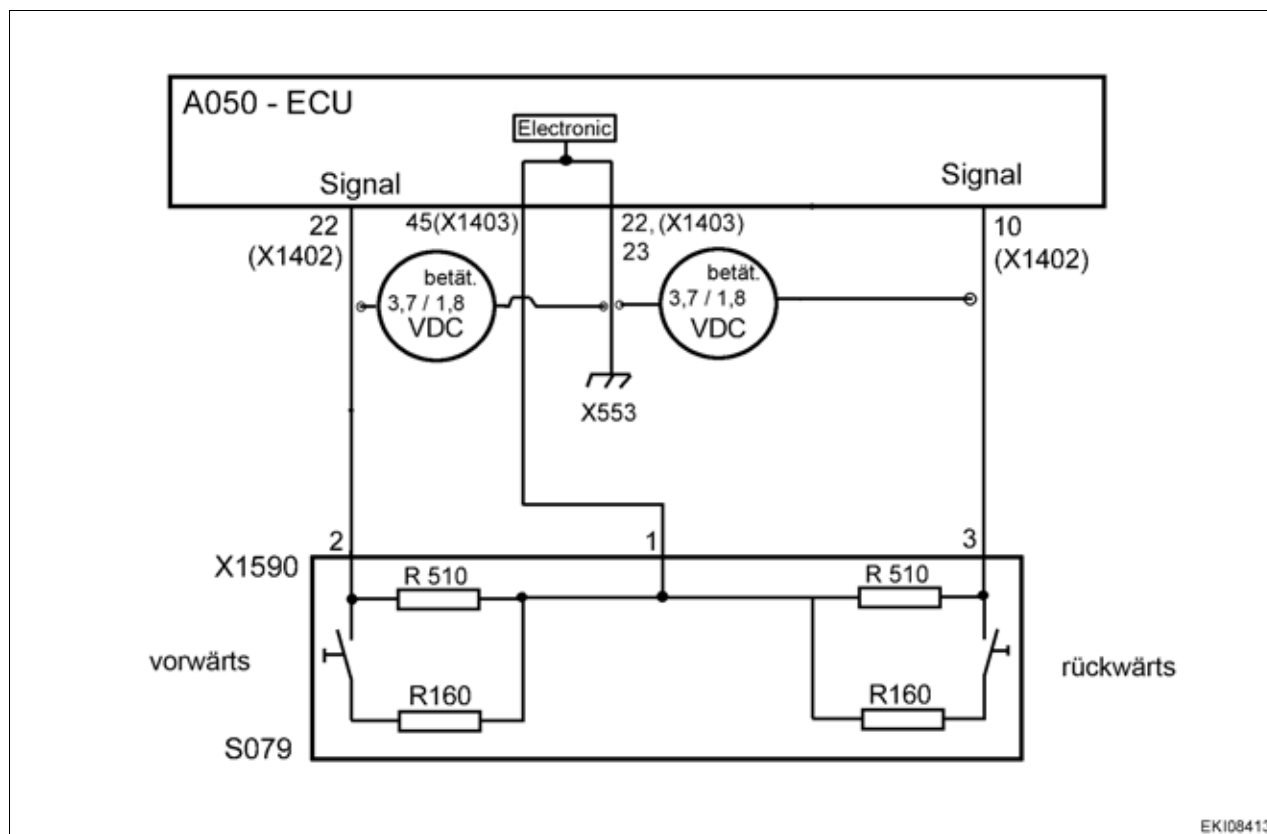


Fig. 426.

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

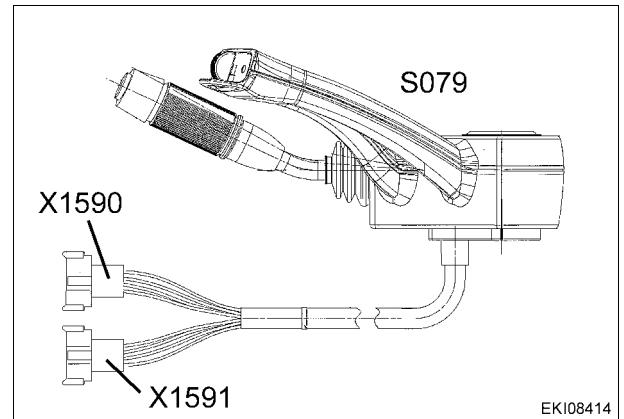


Fig. 427.

EKI08414
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)

see §34

Possible cause of fault

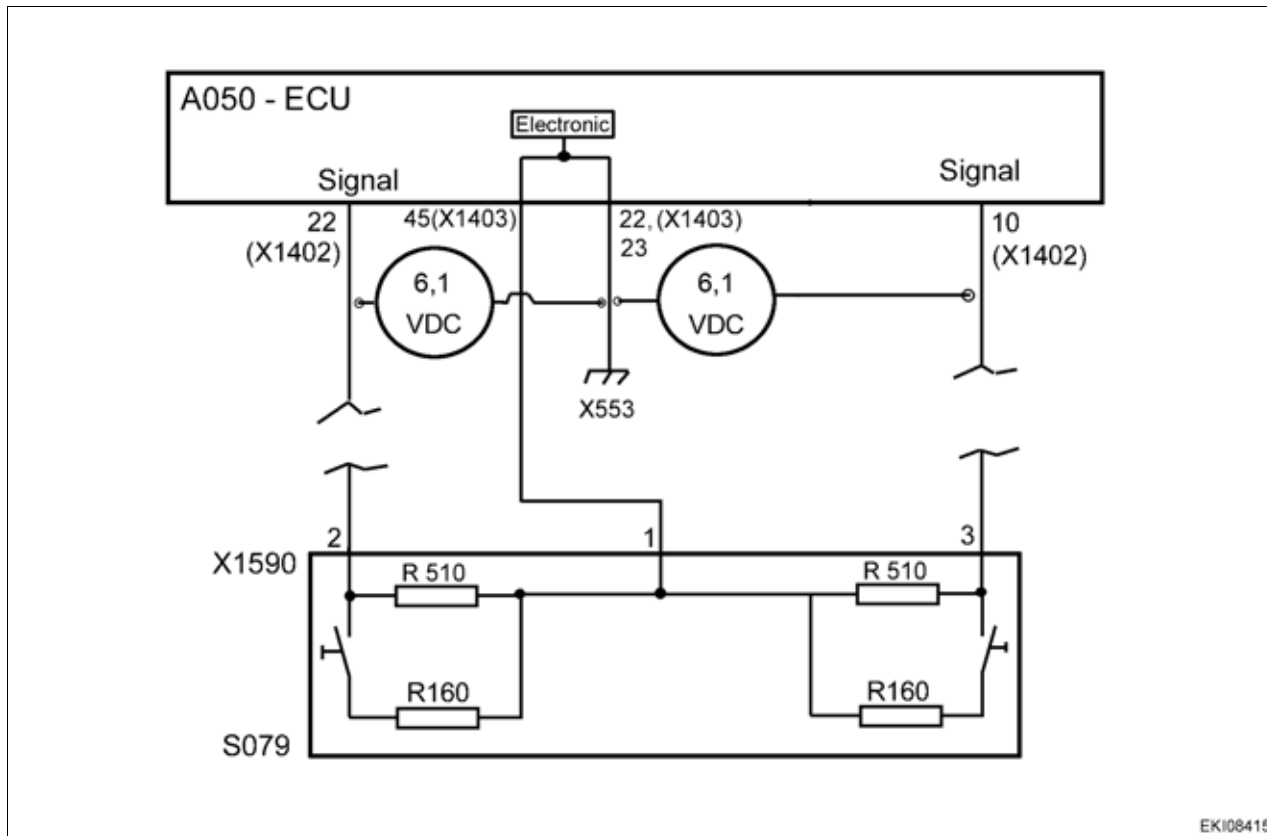


Fig. 428.

110 S079 steering column/quick reverse switch (area: steering column)

Circuit diagram: steering column switch

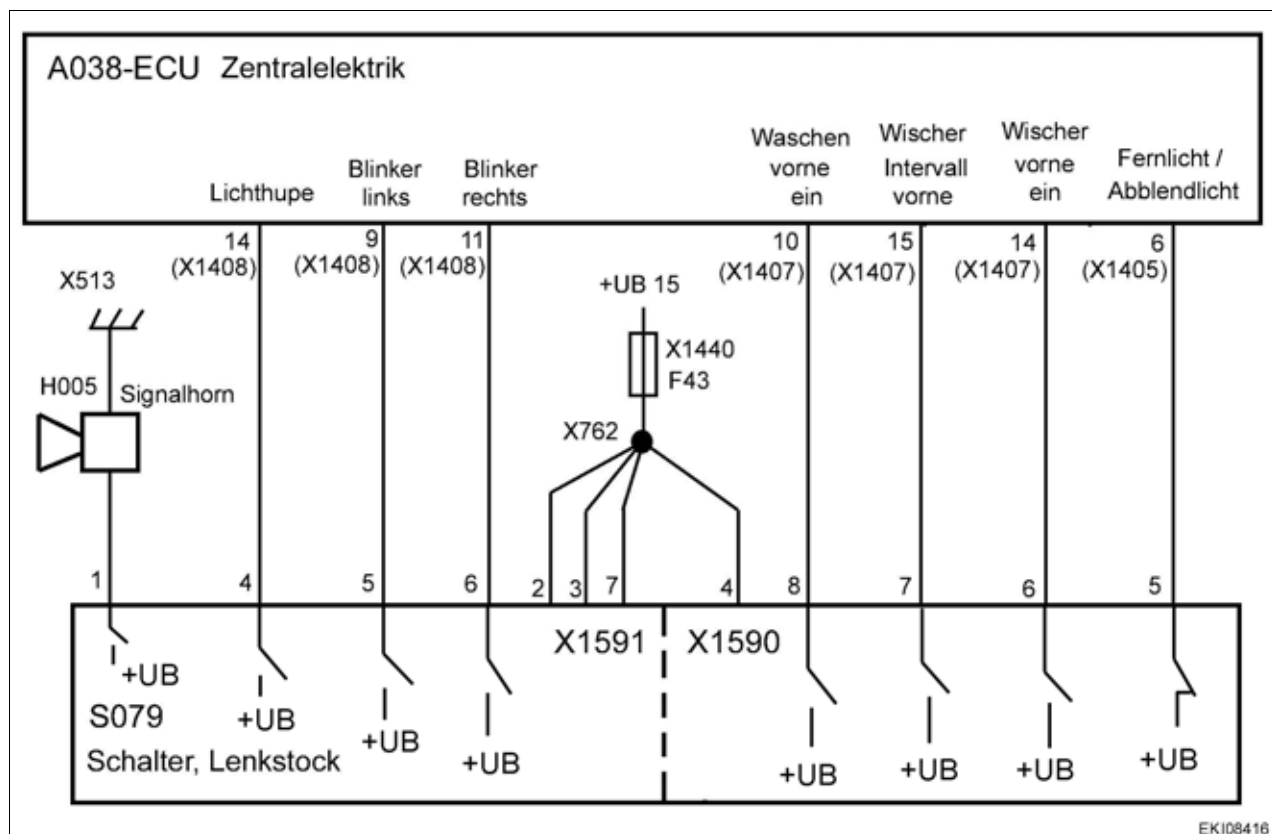


Fig. 429.

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

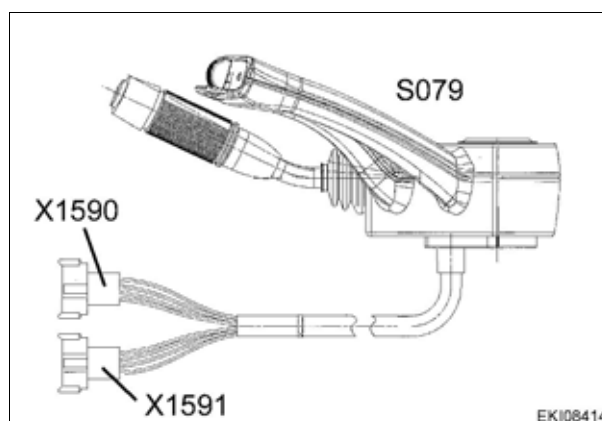


Fig. 430.

1001723

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

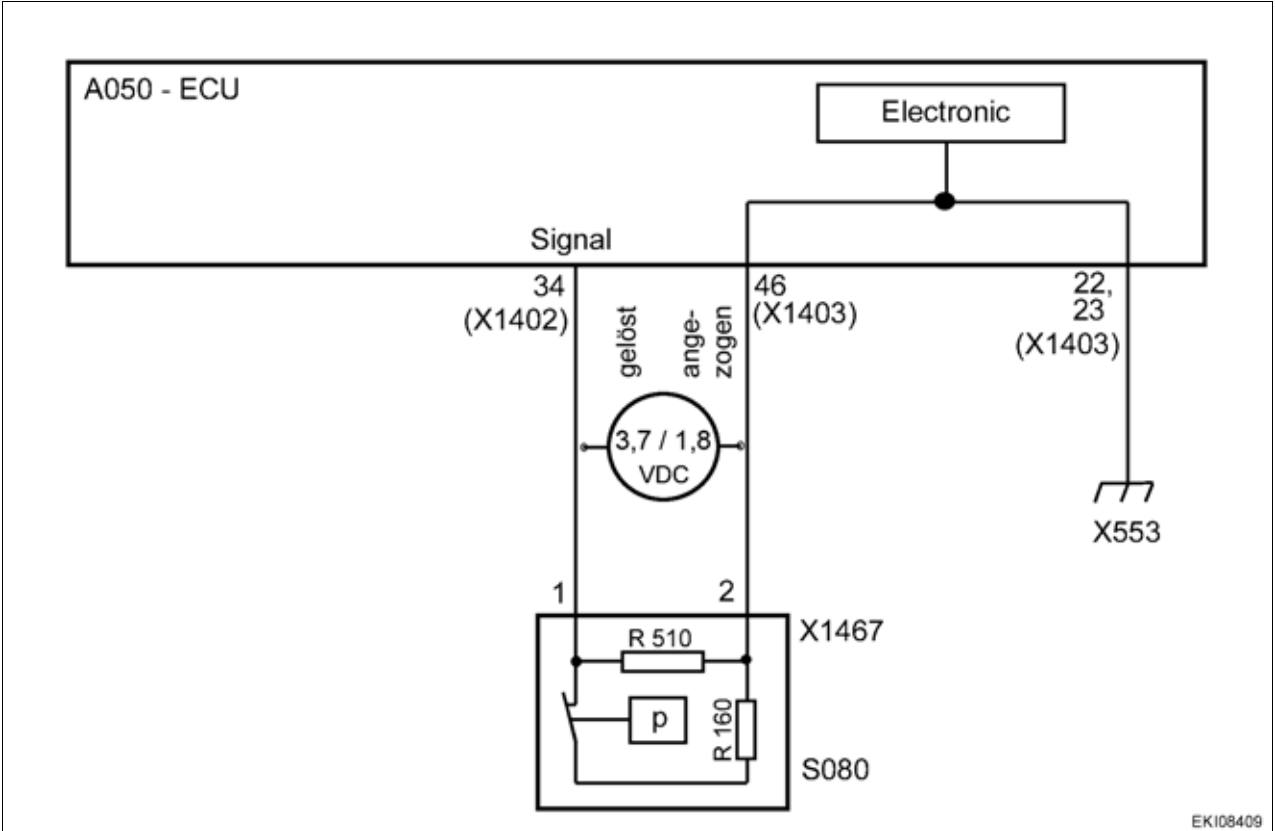


Fig. 431.

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.

1001138

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

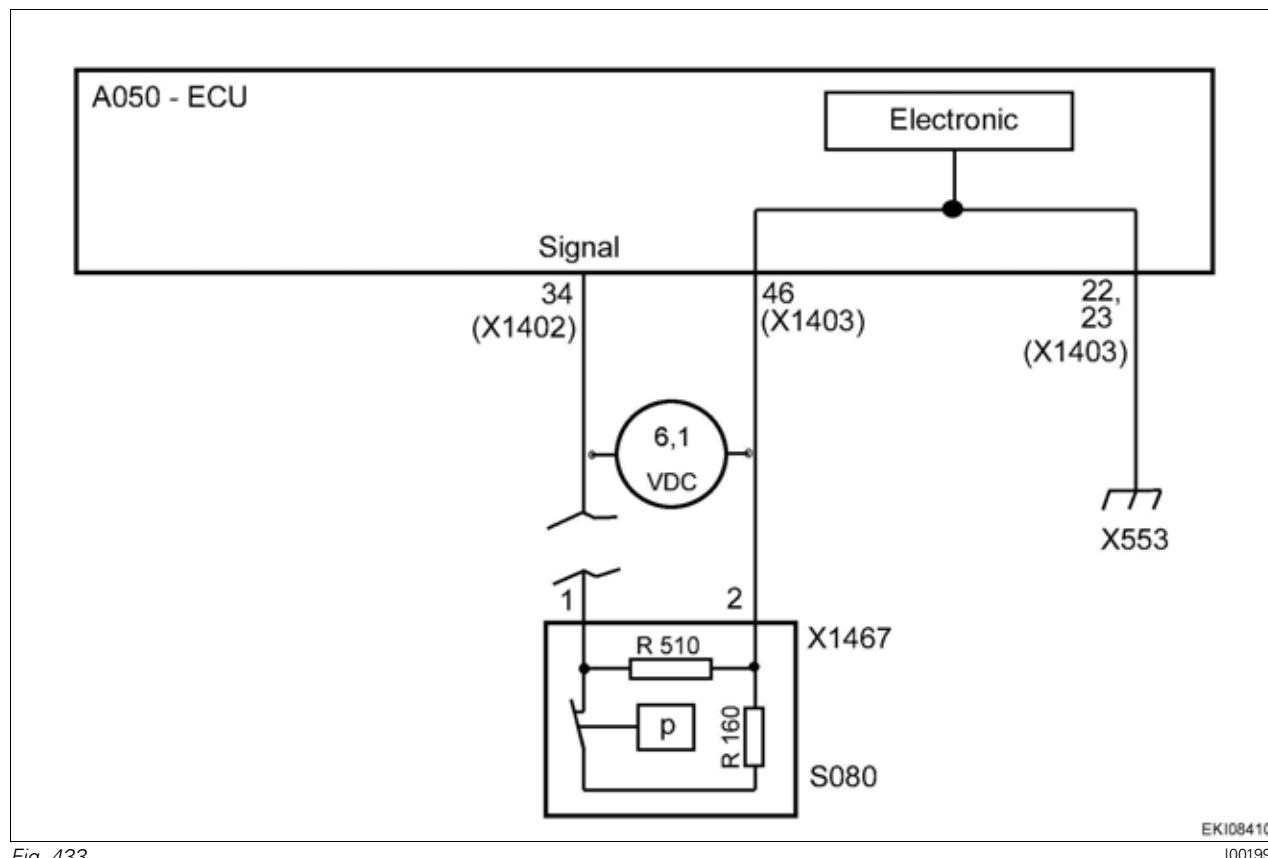


Fig. 433.

EK108410

1001991

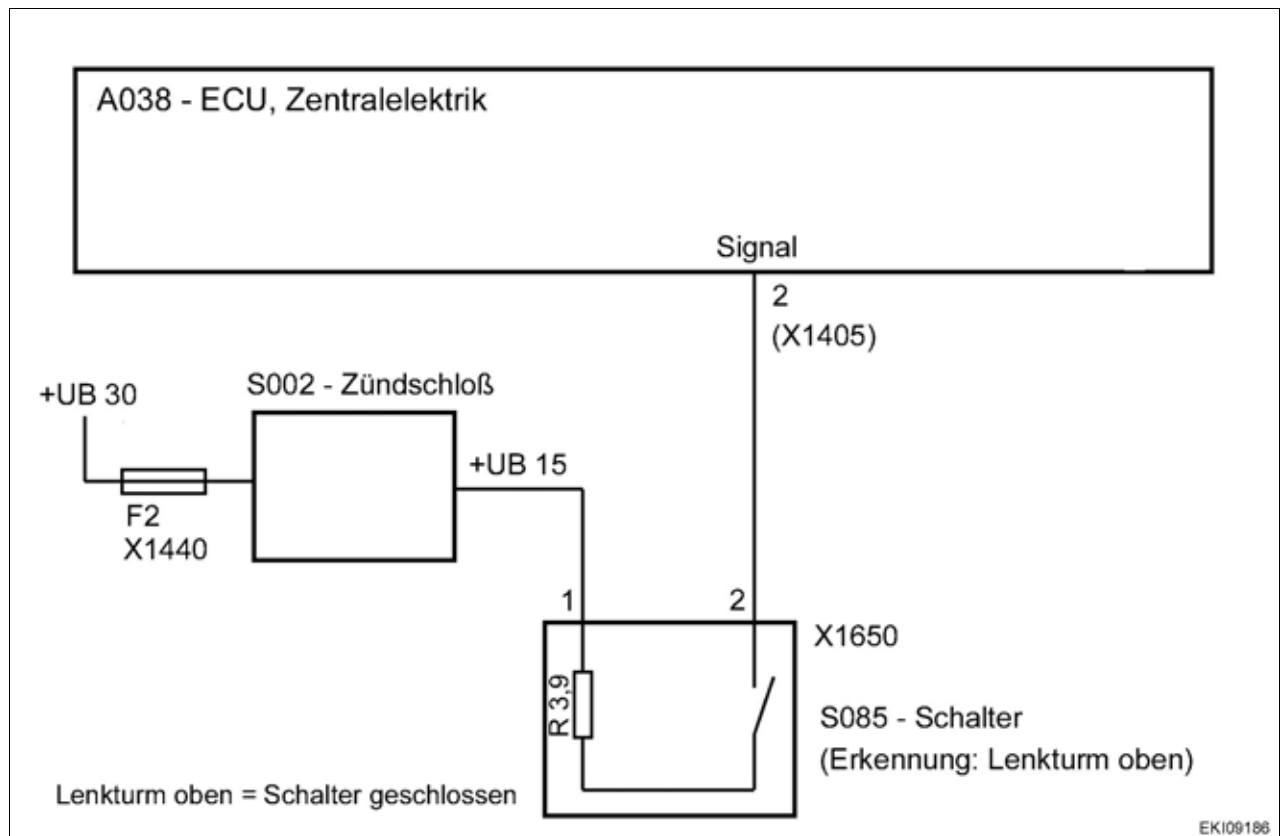
112 S085 switch, reverse operation (recognition: steering column, top)

Fig. 434.

Measuring points and signal values

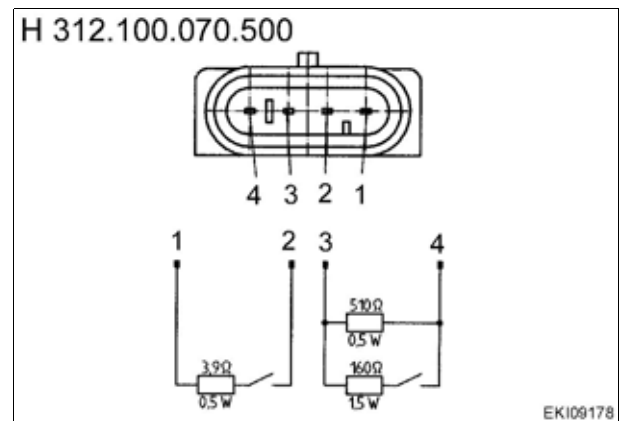
Solenoid switch (contact)
(H 312.100.070.500)**Solenoid is upstream of the solenoid switch:**
Switch closed**Solenoid removed from the solenoid switch:**
Switch open

Fig. 435.

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 component
S085 switch, reverse operation (detection: steering column, top)					
B2 (X1405)	Recognition S085 switch (steering column 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

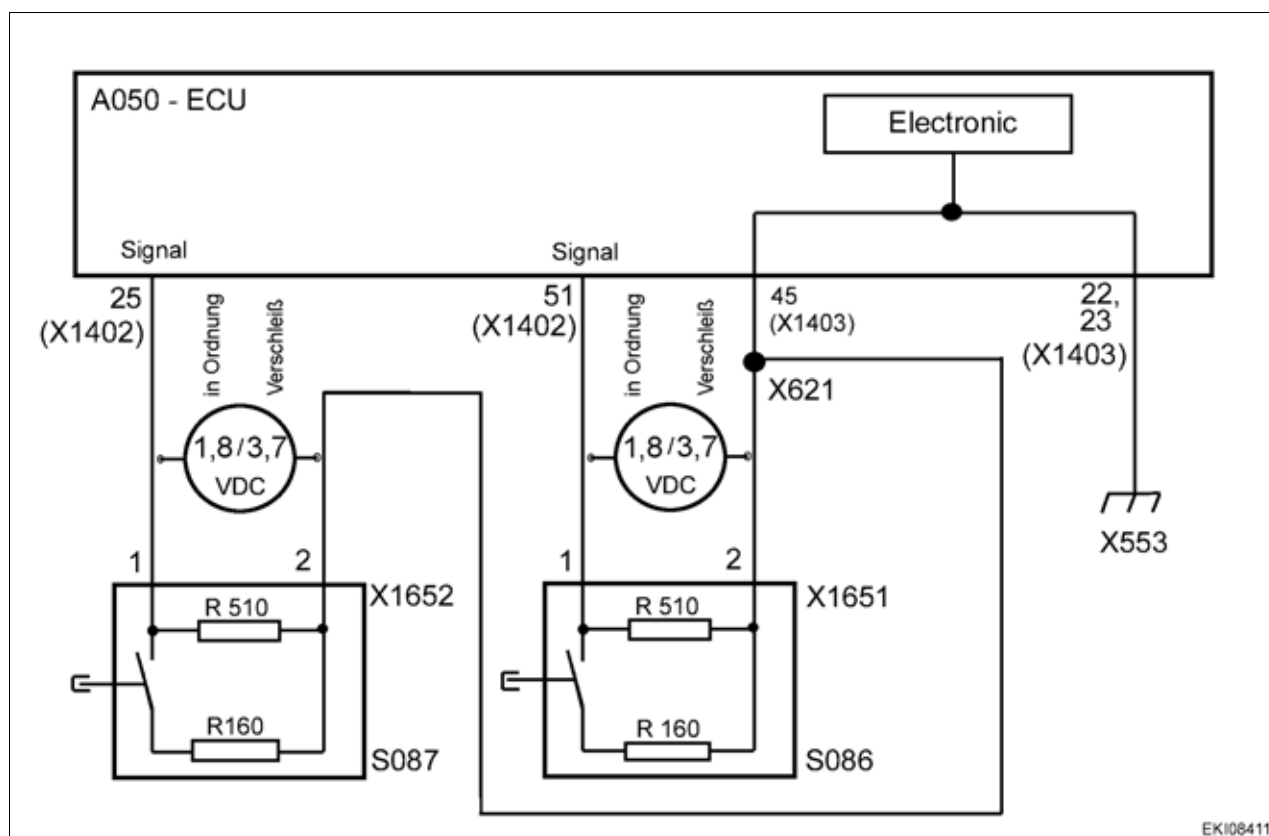


Fig. 436.

EK108411

1001992

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

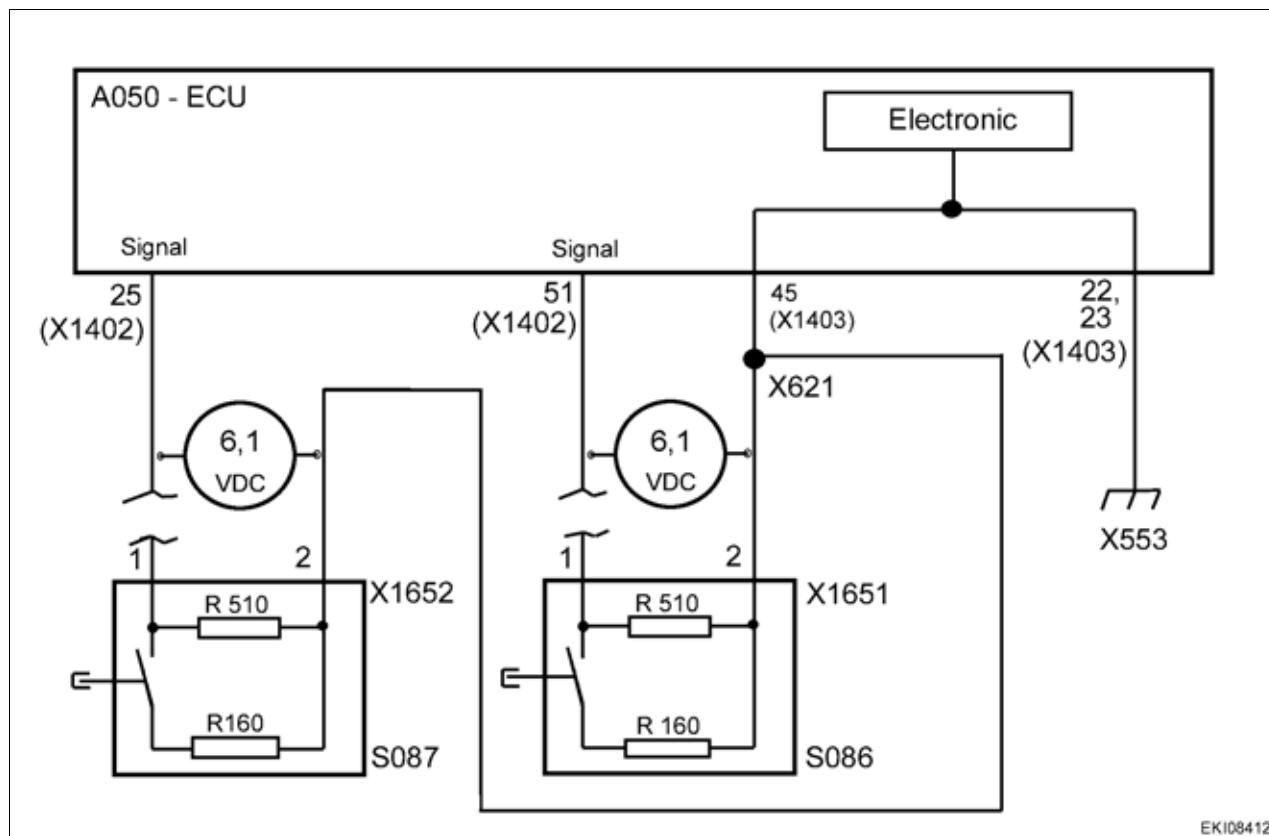


Fig. 438.

EK108412

1001993

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)

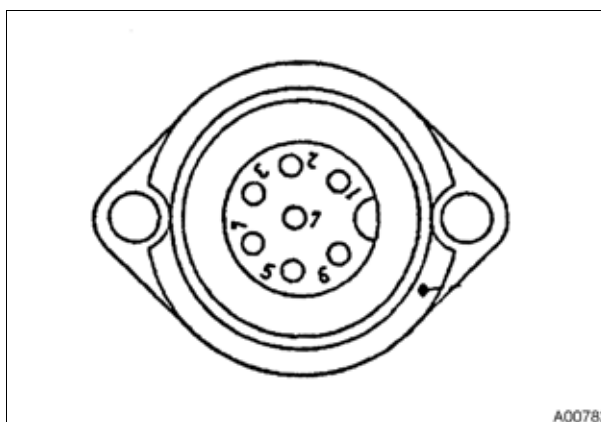


Fig. 441.

A00782

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)

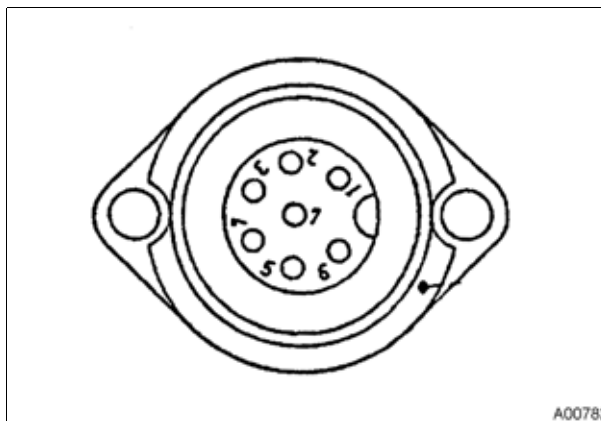


Fig. 442.

A00782

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)

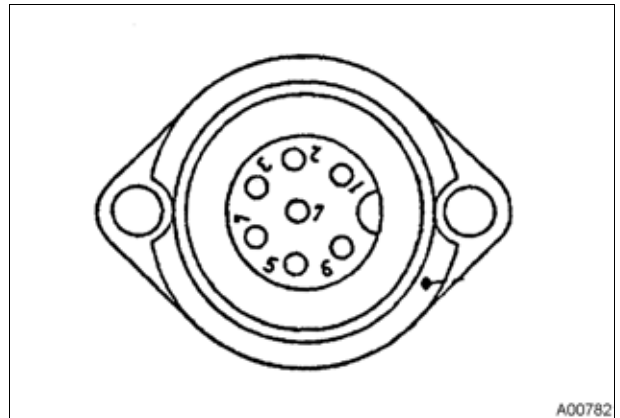


Fig. 443.

A00782
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

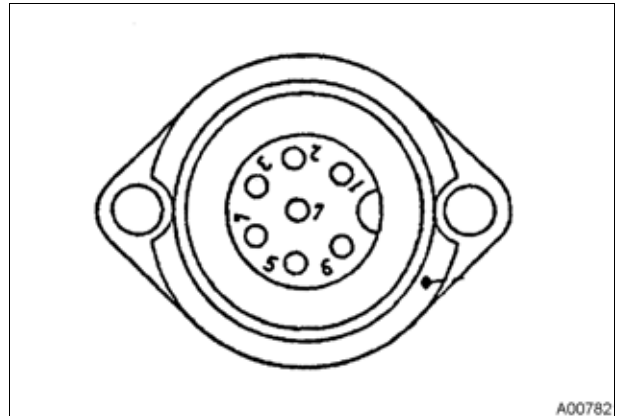


Fig. 444.

A00782
I002748**5 = linkage status (rear power lift)**

Linkage (rear power lift)	Voltage level (U)
Lower limit position:	0 VDC
Upper limit position:	10 VDC

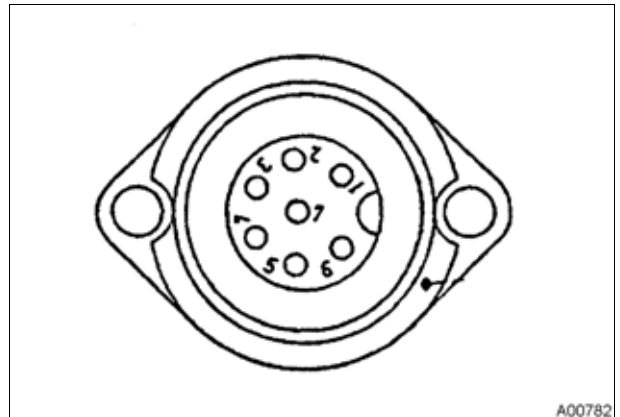


Fig. 445.

A00782
I002748**6 = +supply (+UB 15)**

Fuse (F40) on the X1440 fuse holder

	Voltage level (U)
Ignition OFF	0 VDC
Ignition ON.	10 VDC

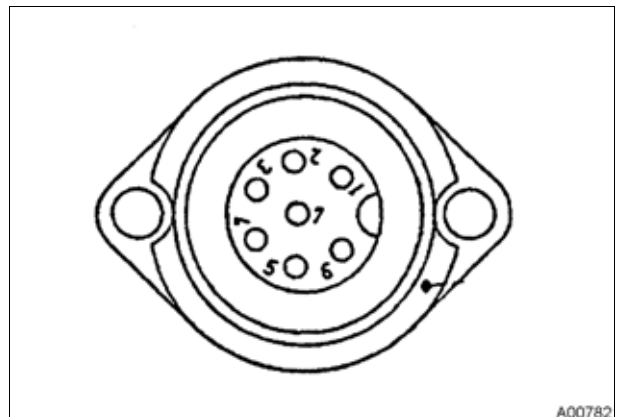


Fig. 446.

A00782
I002748

7 = earth

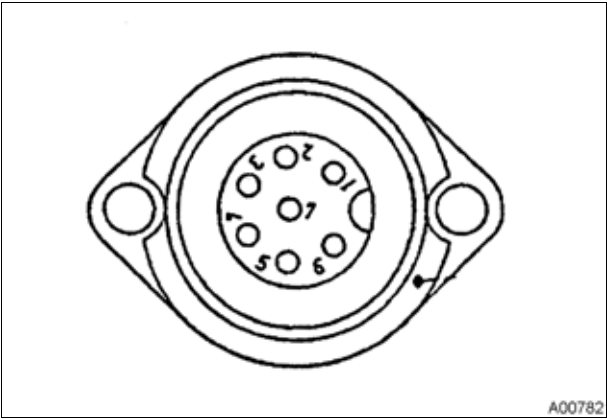


Fig. 447.

A00782
1002748

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**

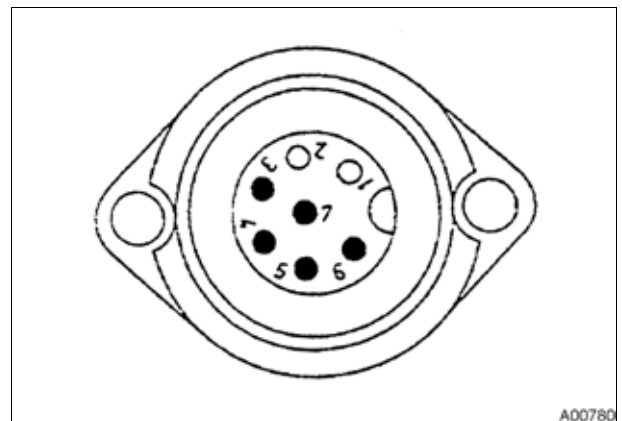


Fig. 449.

A00780

I002753

Checking the event counter in the Vario terminal

Overview image of the Vario terminal

Press F6.

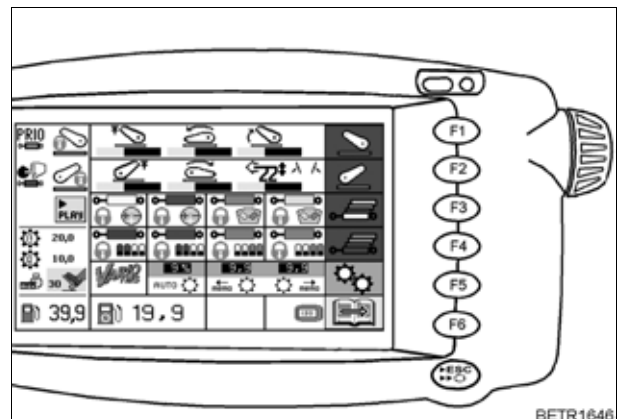


Fig. 450.

BETR1640

I002750

The sub-menu is displayed.

Press F1.

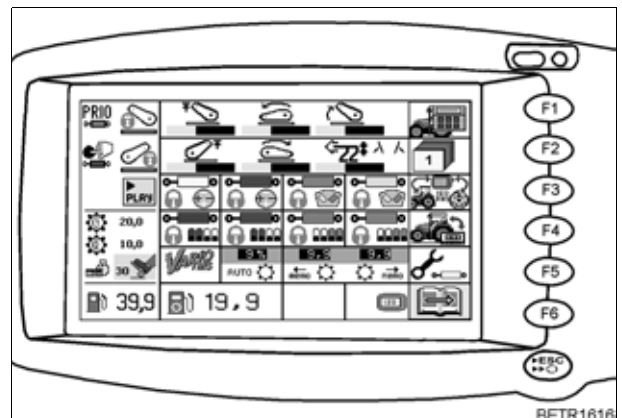


Fig. 451.

BETR1616

I002751

The "hectare counter" is displayed.

Press F5.

The event counter is active (green).

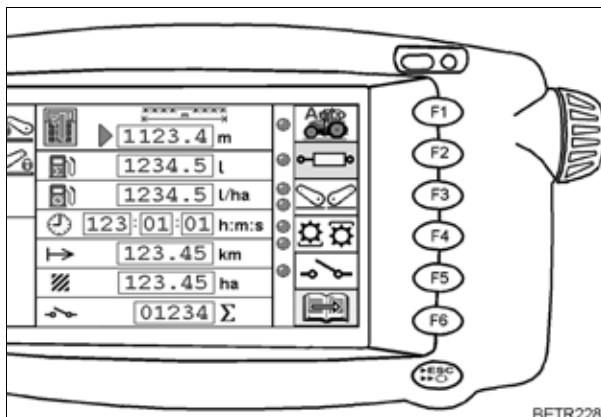


Fig. 452.

1002752

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.

1002755

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.

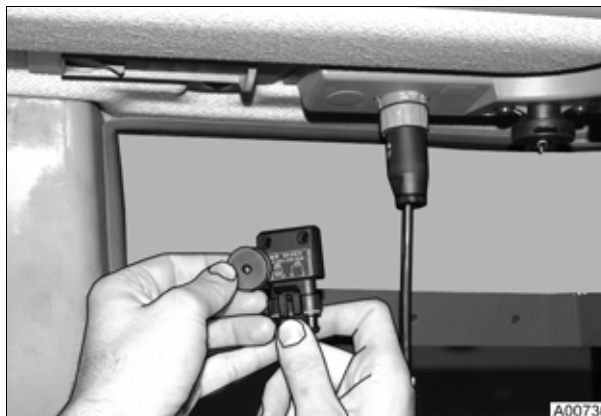


Fig. 454.

1002754

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

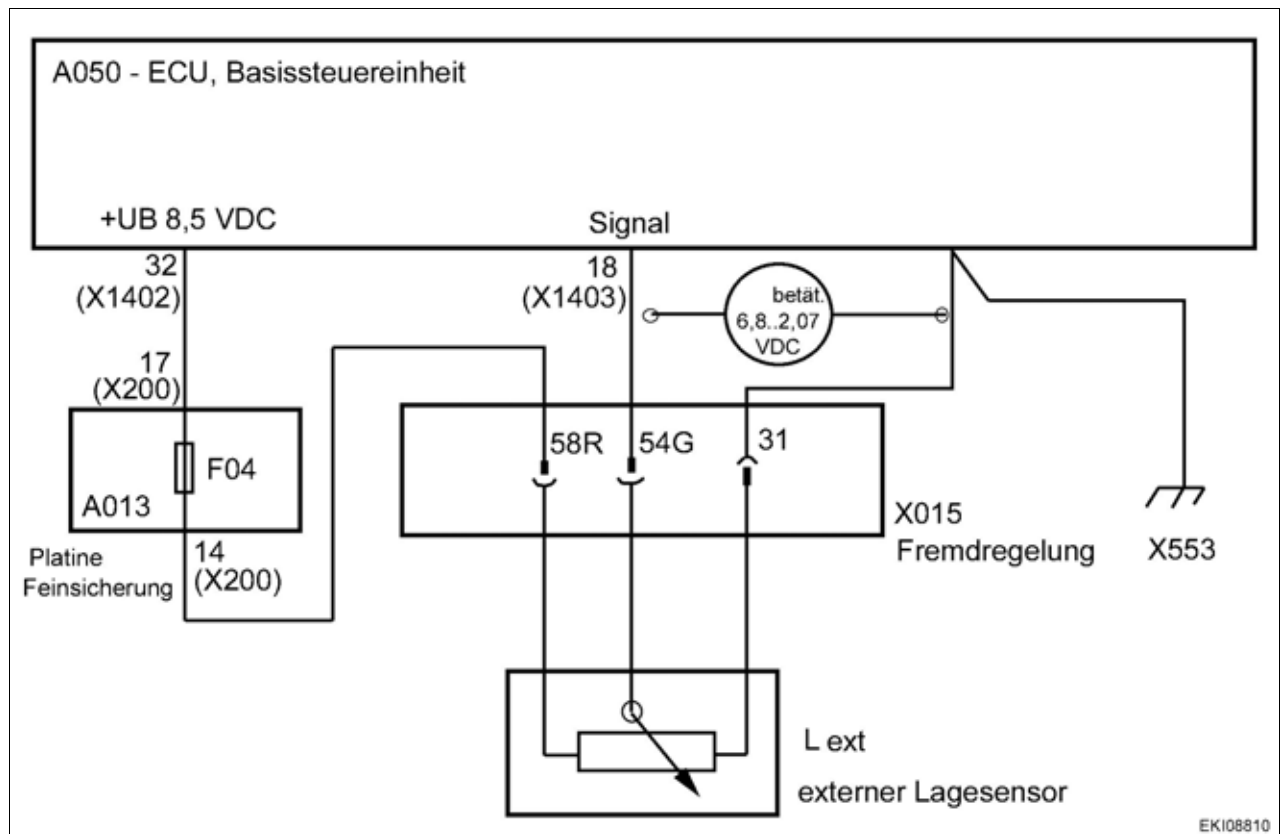


Fig. 455.

1002824

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

+supply for the external position sensor

Ignition ON.

Pin	Voltage level (U)
58R	8.5 VDC
31 (earth)	

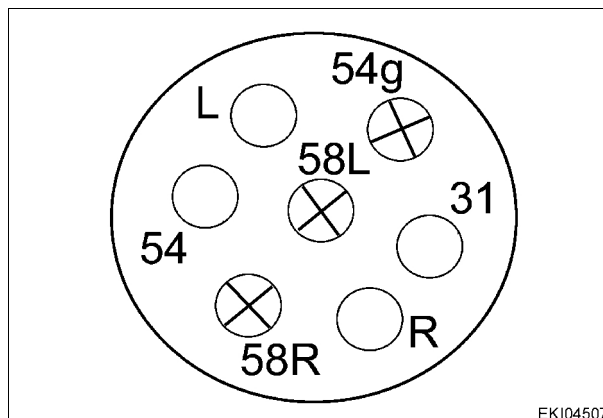


Fig. 456.

EK104507
1002779

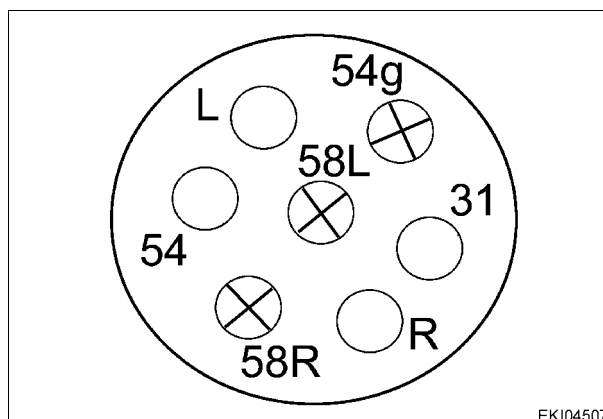


Fig. 457.

EK104507
1002779

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

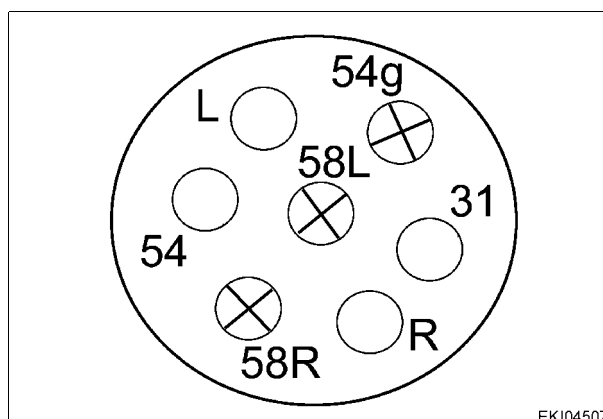


Fig. 458.

EK104507
1002779

NOTE: see §22
see §34

Bedienung und Funktion der Fremdregelung

117 X015 external control (range: 3rd and 4th hydraulic circuit) (professional version only)

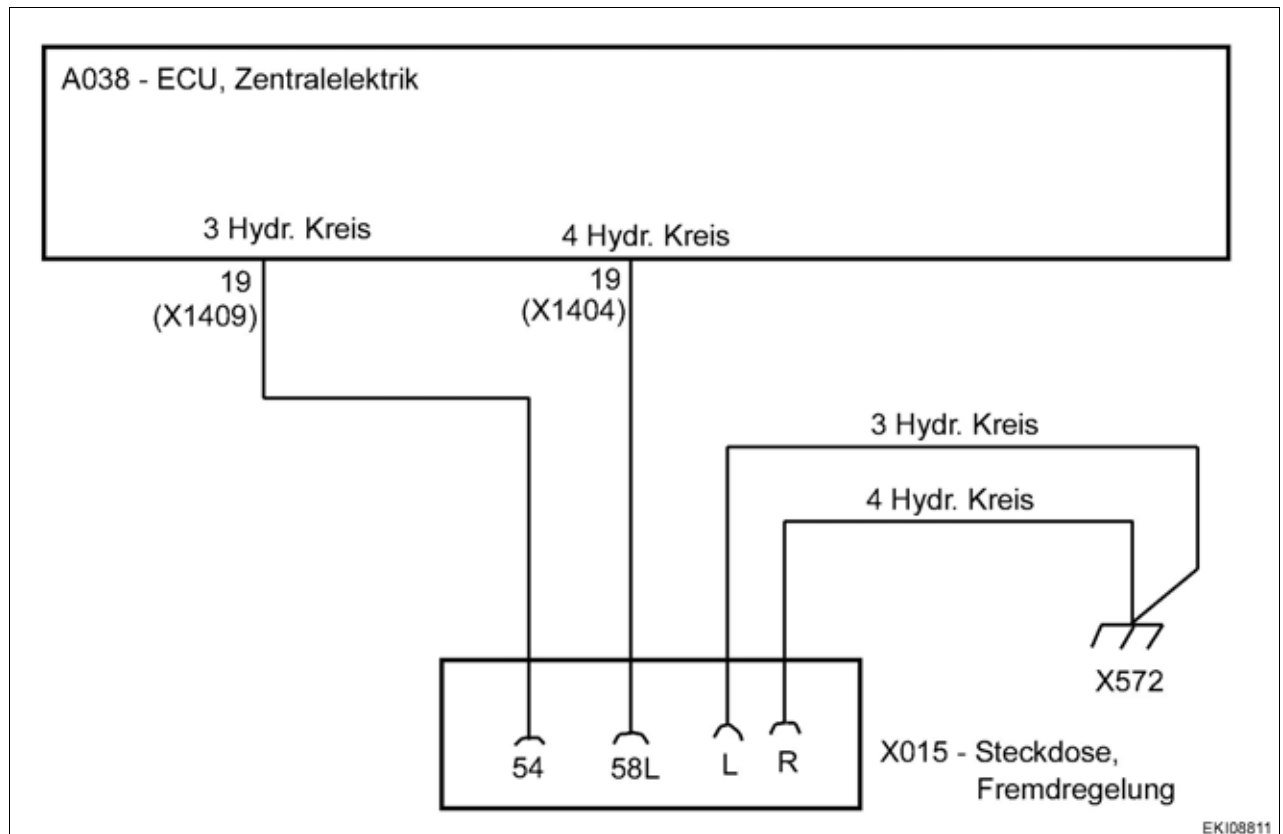


Fig. 459.

Using multimeter (voltmeter),
check voltage level at socket.

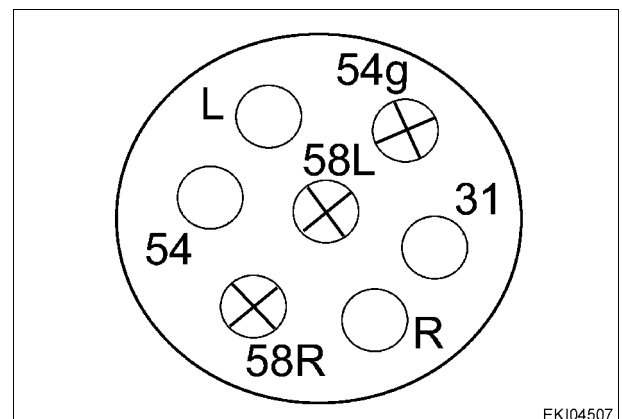


Fig. 460.

3. Hydraulic circuit

Ignition ON.

Engine is running

Pin	Voltage level (U)
54	0 VDC (switch not actuated) 14 VDC (switch actuated)
L (earth)	

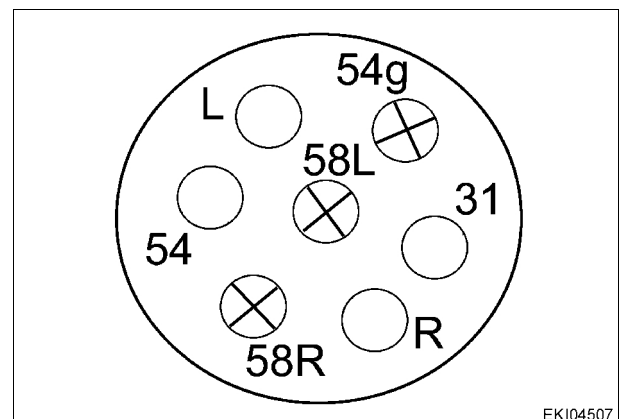
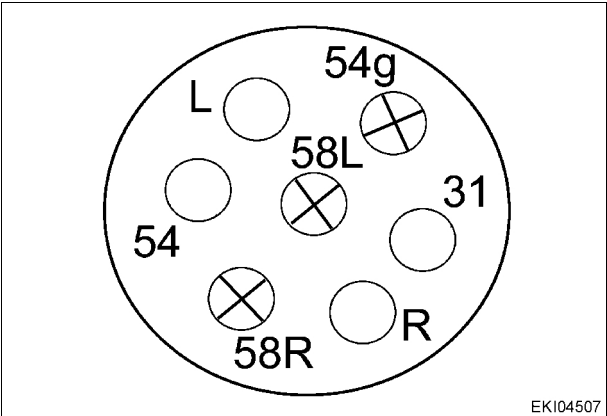


Fig. 461.

4. Hydraulic circuit

Ignition ON.
 Engine is running

Pin	Voltage level (U)
58L	0 VDC (switch not actuated) 14 VDC (switch actuated)
R (earth)	



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

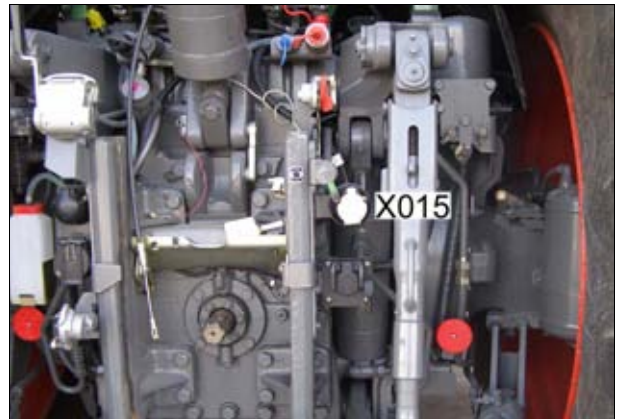


Fig. 463.

I001300



Fig. 464. Electronic box for steering axle control (F 931.970.020.010)

EKI09187

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

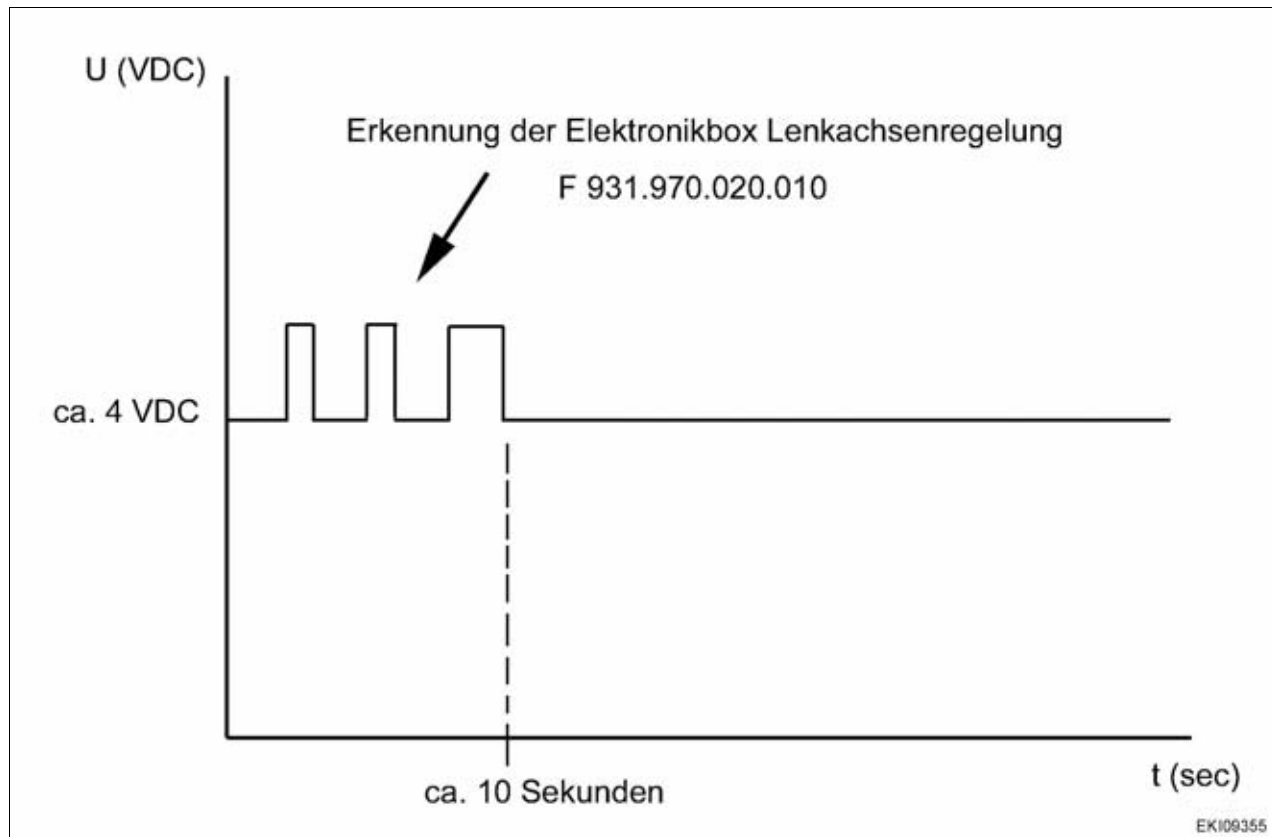


Fig. 465. Diagram: Detection (initialisation) of the electronic box for steering axle control (F 931.970.020.010)

1005868

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.

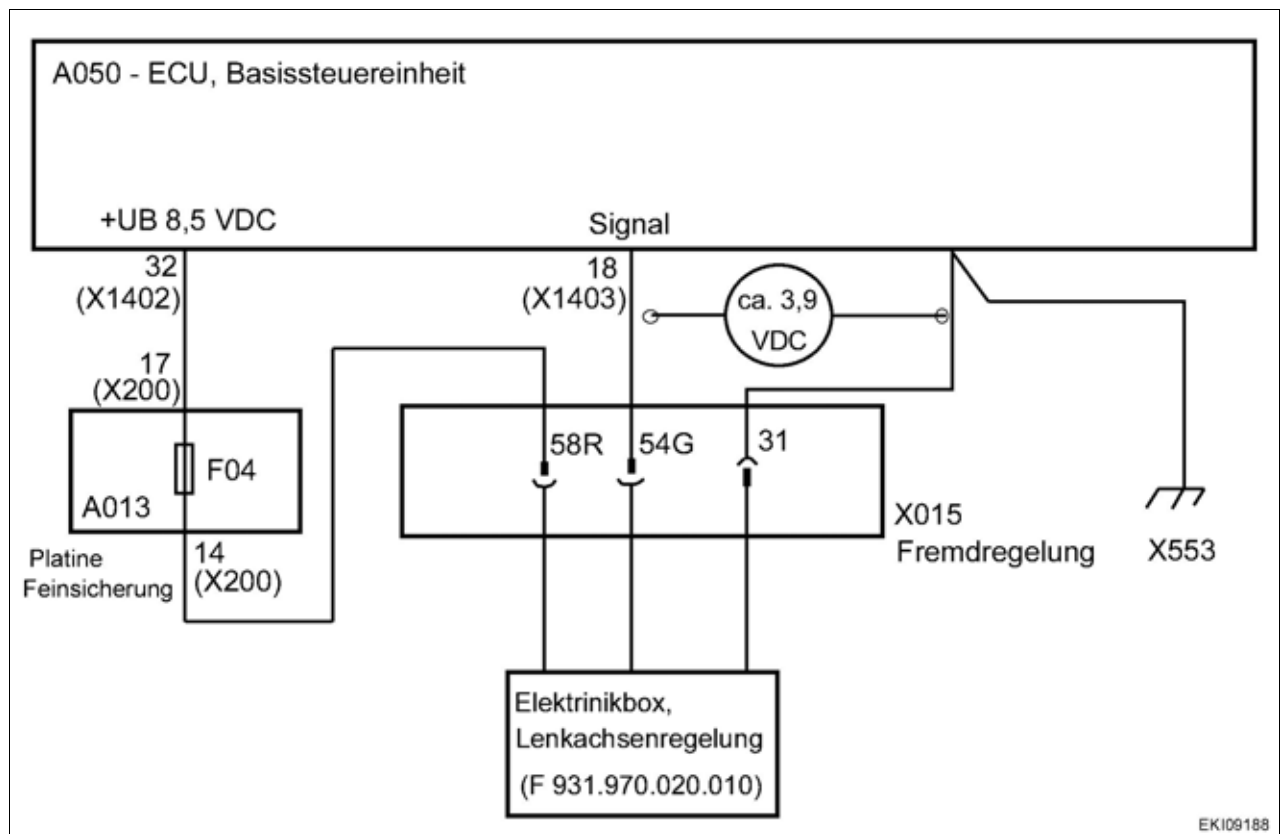


Fig. 466. Circuit diagram

I004841

Item	Designation	Note
A013 PCB microfuse (microfuse no. 4)		
X200	Separation point on A013 PCB_microfuse	
Pin 17	+ supply for the A013 PCB microfuse (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 microfuse (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	

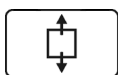
Item	Designation	Note
Pin 54G	Signal	
Pin 58R	+ supply (8.5 VDC)	Switch on ignition.
X553 earth pin		

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.

1001030

Measuring points on the A050 ECU, basic control unit (X1403 separation point)

Pin	Function
18 (on X1403)	Signal
-	Vehicle earth



Fig. 468.

EKI08386
 1001668

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).

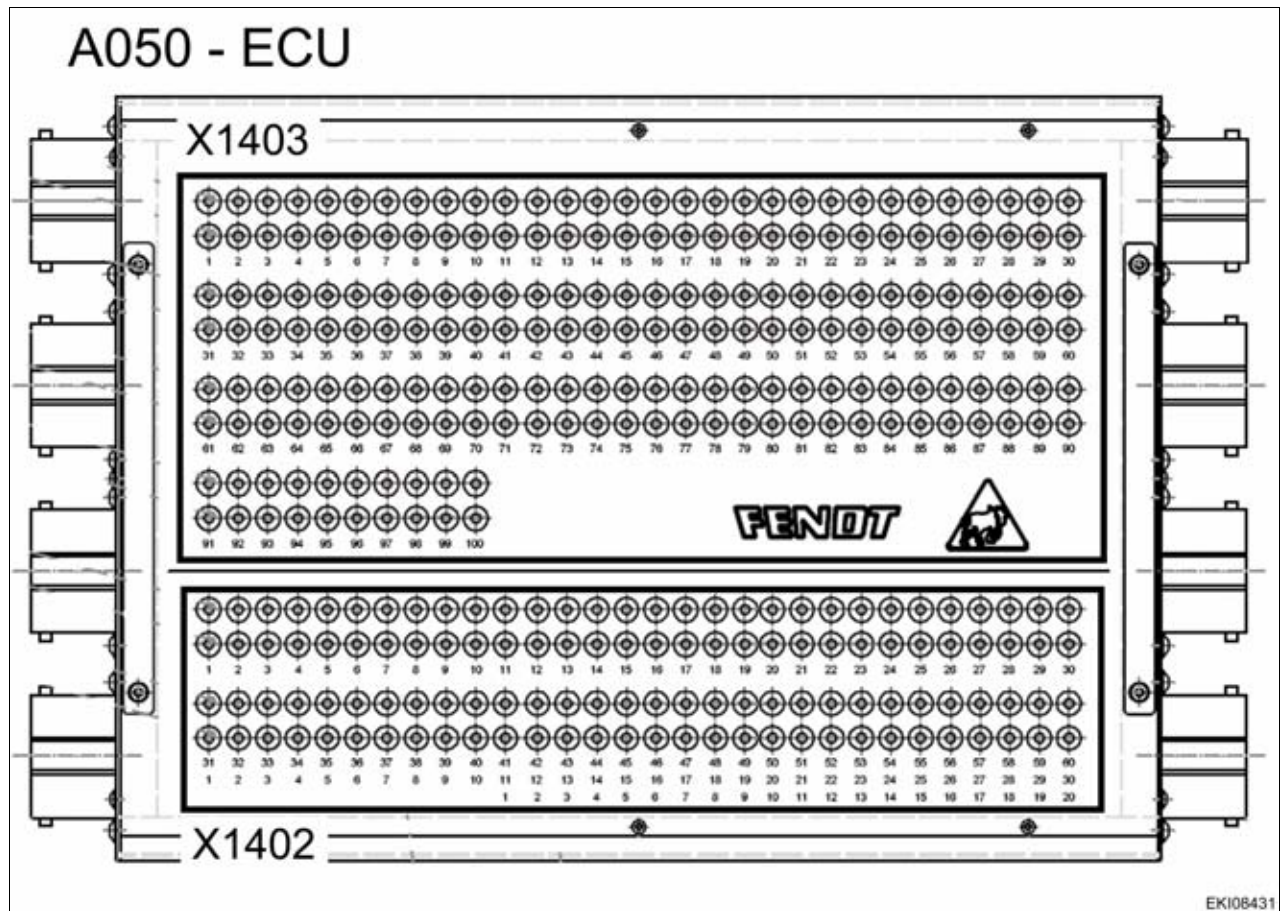


Fig. 469.

EKI08431
I001874

X015 external control socket	
Pin	Function
58R	+ supply (8.5 VDC)
31	Earth
54G	Signal (Trailer detection)

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)	

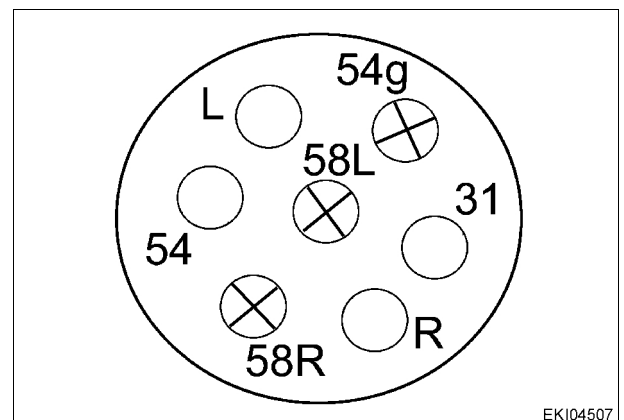


Fig. 470.

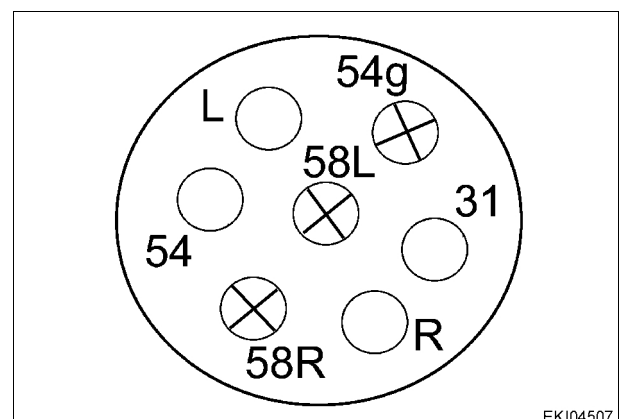
EKI04507
I002779

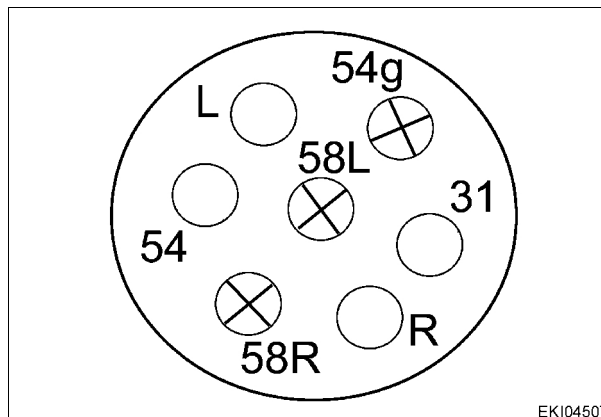
Fig. 471.

EKI04507
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)	

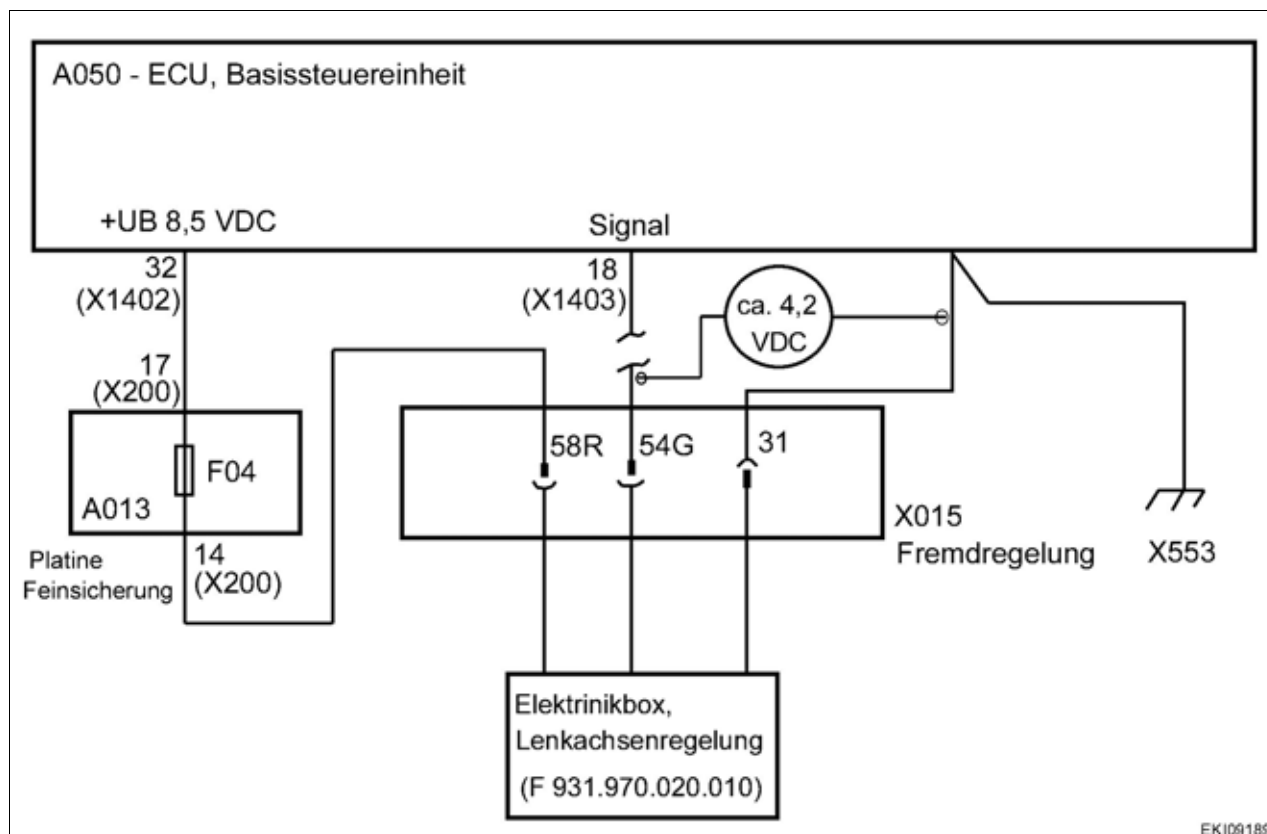


EK104507

1002779

Fig. 472.

Possible cause of fault



EK109189

Fig. 473.

1004842

Check Chassis Range!

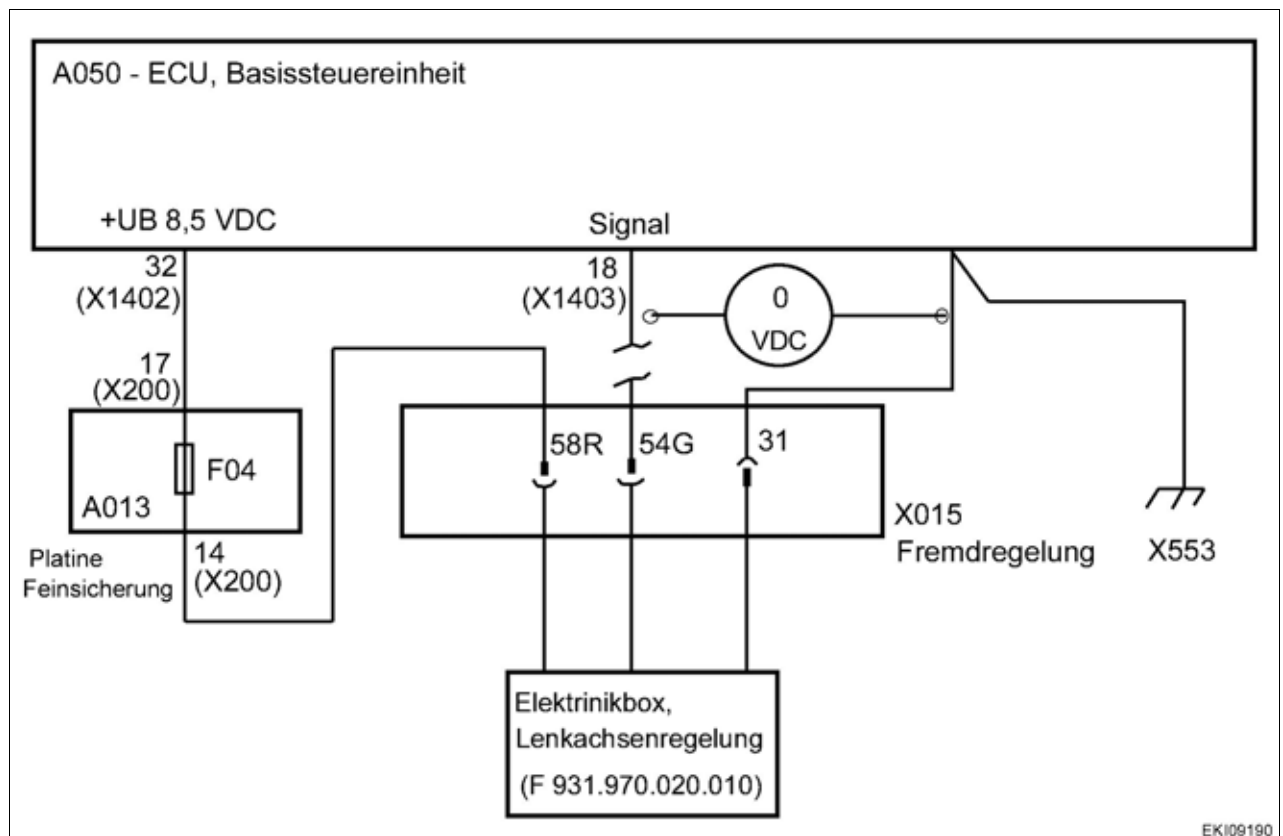


Fig. 474.

EKI09190
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.

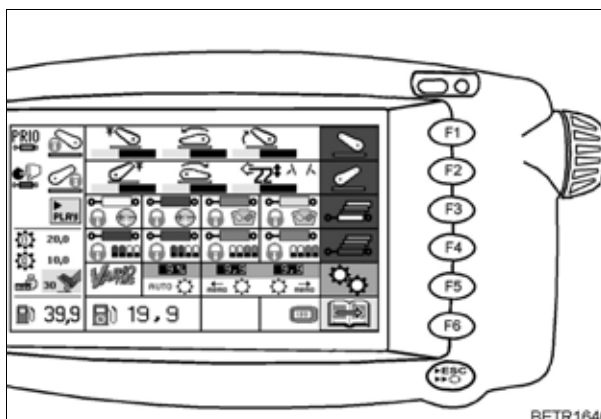


Fig. 475.

BETR1646
1004853

The sub-menu is displayed.
 Press the (F5) key.

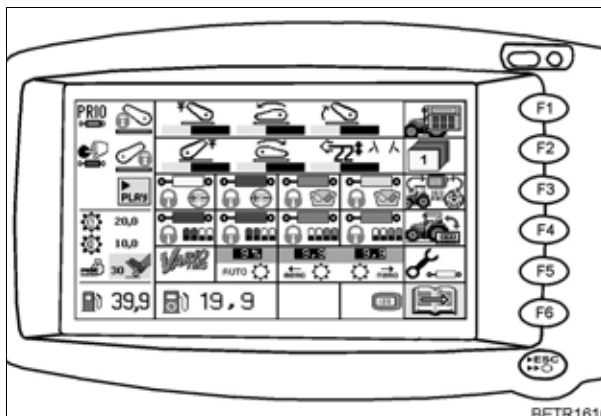


Fig. 476.

BETR1616
1004854

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).

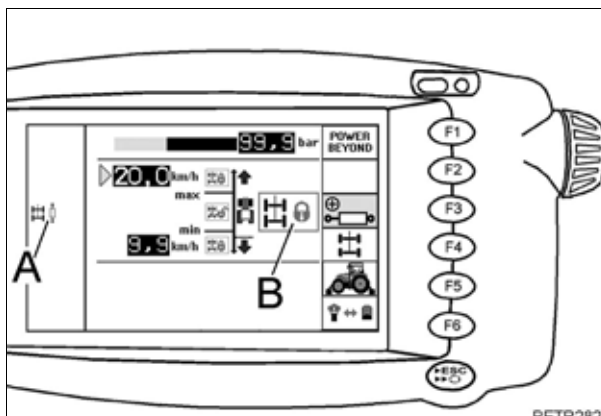


Fig. 477.

BETR2825
1004855

Key (F3):

Confirm whether the required hydraulic valve is connected.

Key (F4):

The hydraulic valve is not activated for the steering axle automatic mode.

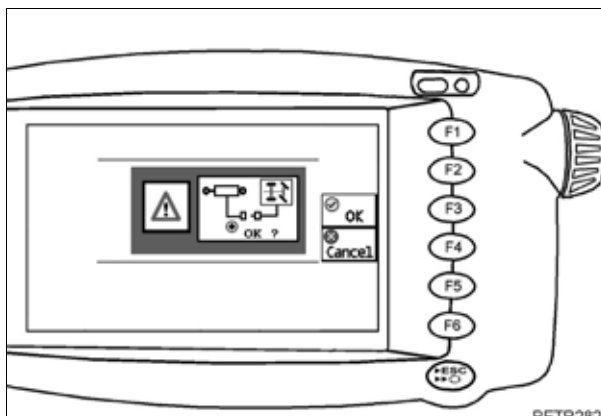


Fig. 478.

BETR2826
1004856

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.

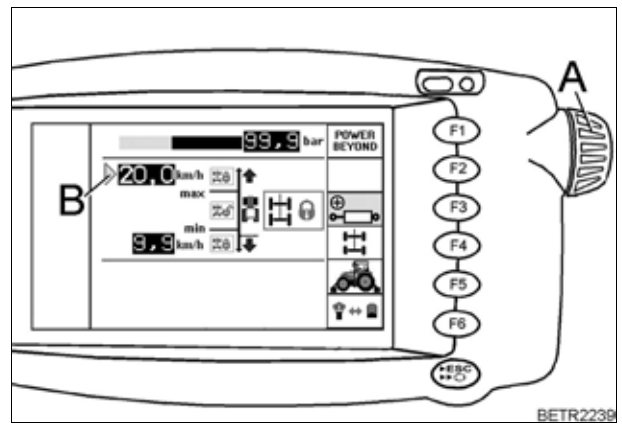


Fig. 479.

BETR2238
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

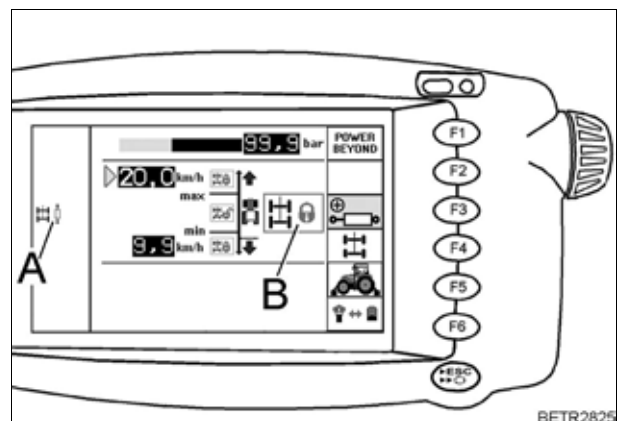
Possible displays**Possible displays (A, B) for the steering axle automatic mode on the main page**

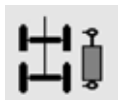
Fig. 480.

BETR2825
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)



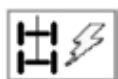
No activation possible (tractor moving)



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

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

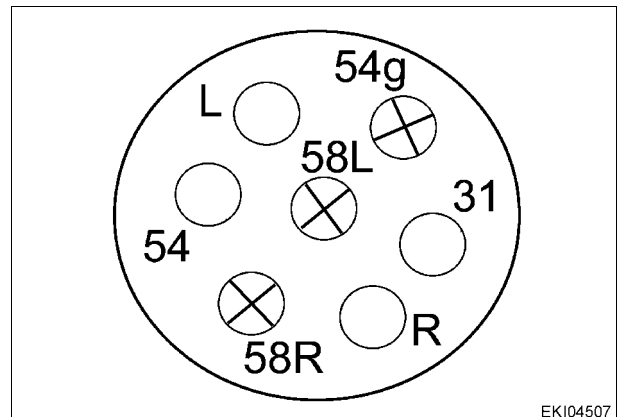


Fig. 482.

EKI04507

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

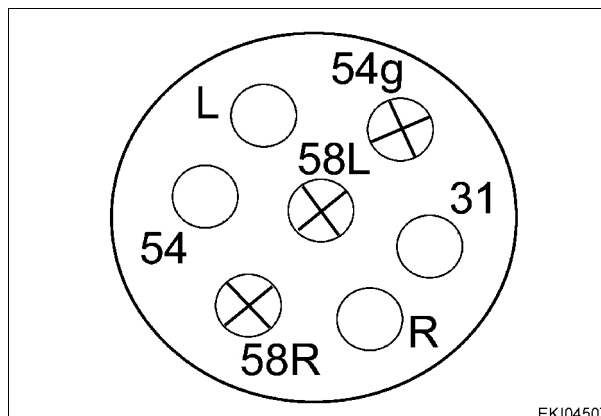


Fig. 483.

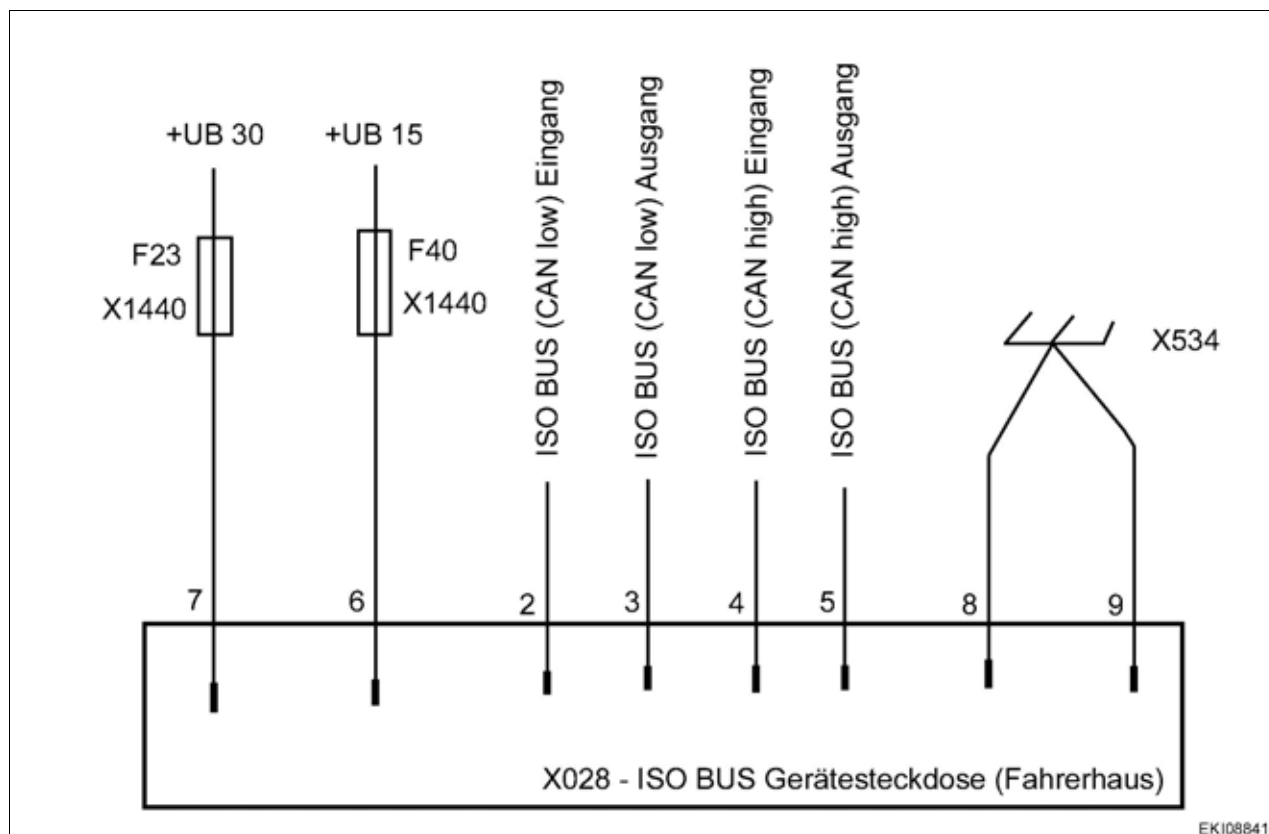
EK104507
 1002779

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)



EK108841

Fig. 484.

I002978

Circuit diagram: ISO BUS

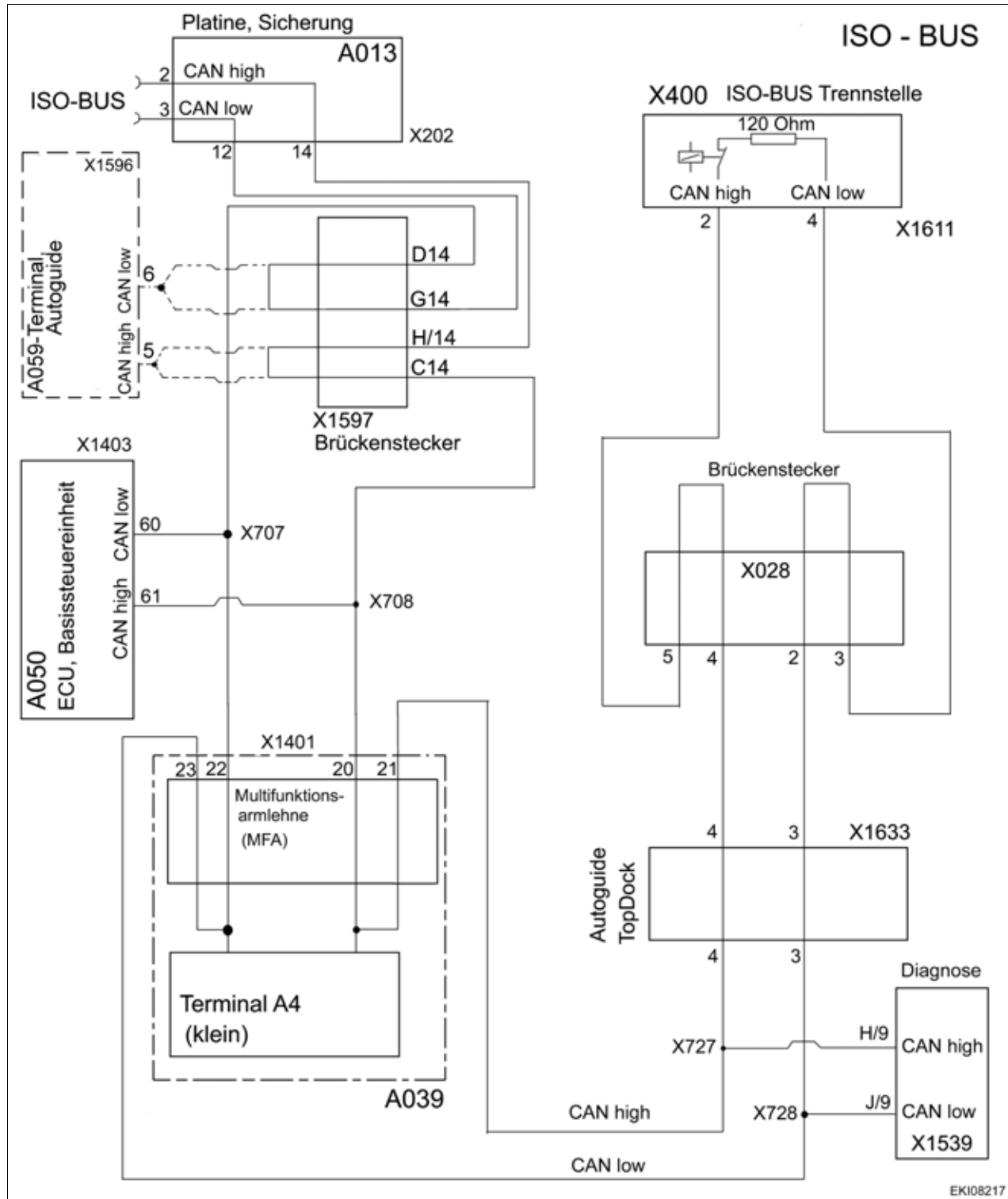


Fig. 485.

EKI08217

1001189

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) out-put
4	ISO BUS (CAN high) input
5	ISO BUS (CAN high) out-put
6	+ UB 15 (ignition ON = 12 VDC)
7	+ UB 30 (12 VDC)
8	Earth
9	Earth

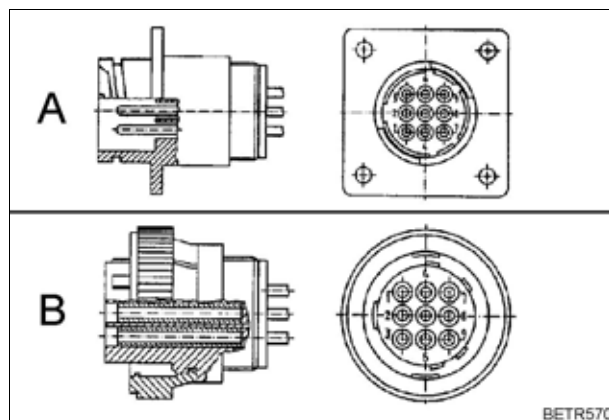


Fig. 486.

122 X400 ISO BUS PCB (implement socket)

Circuit diagram: X400 ISO BUS PCB (implement socket)

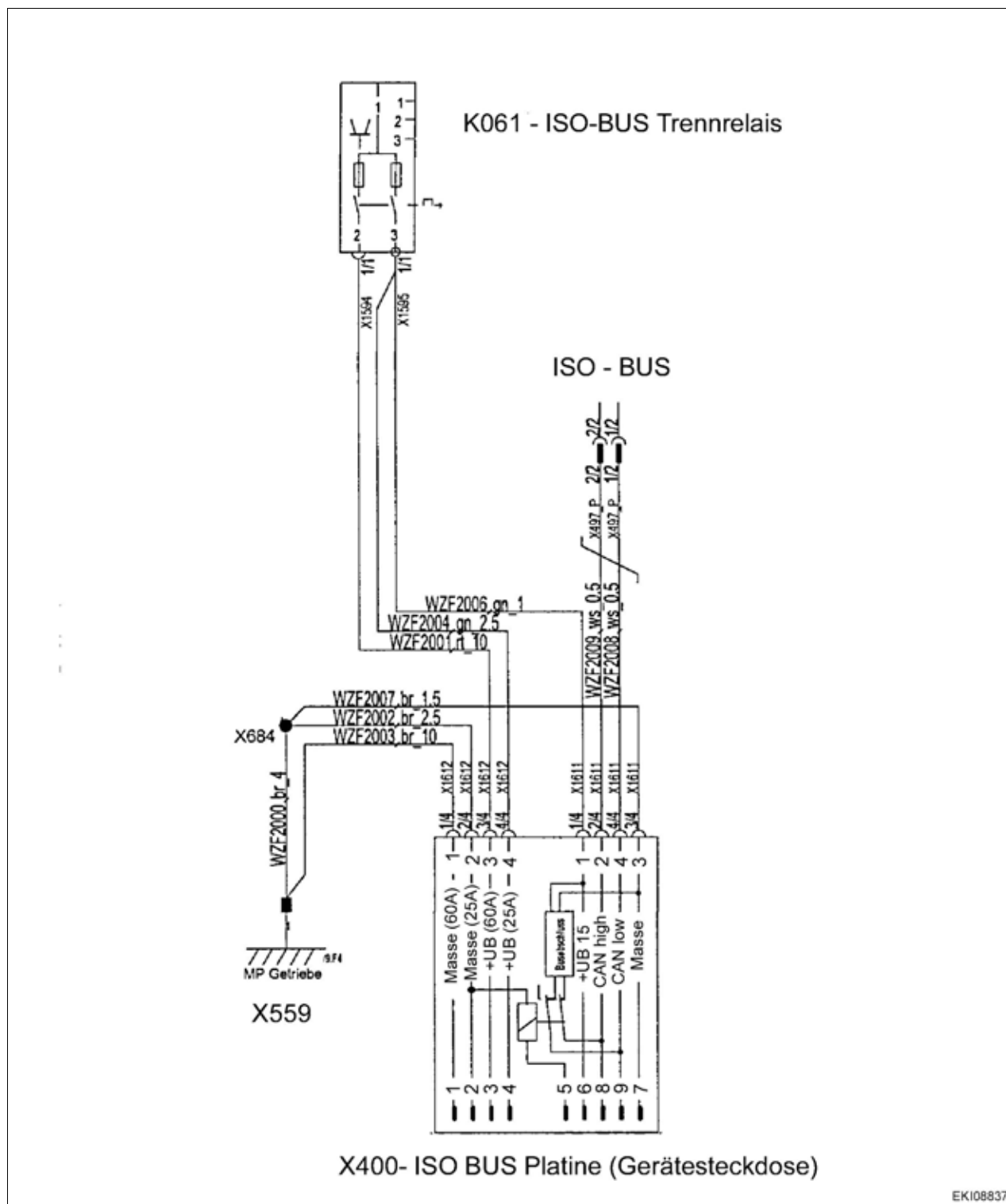


Fig. 487.

1002972

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

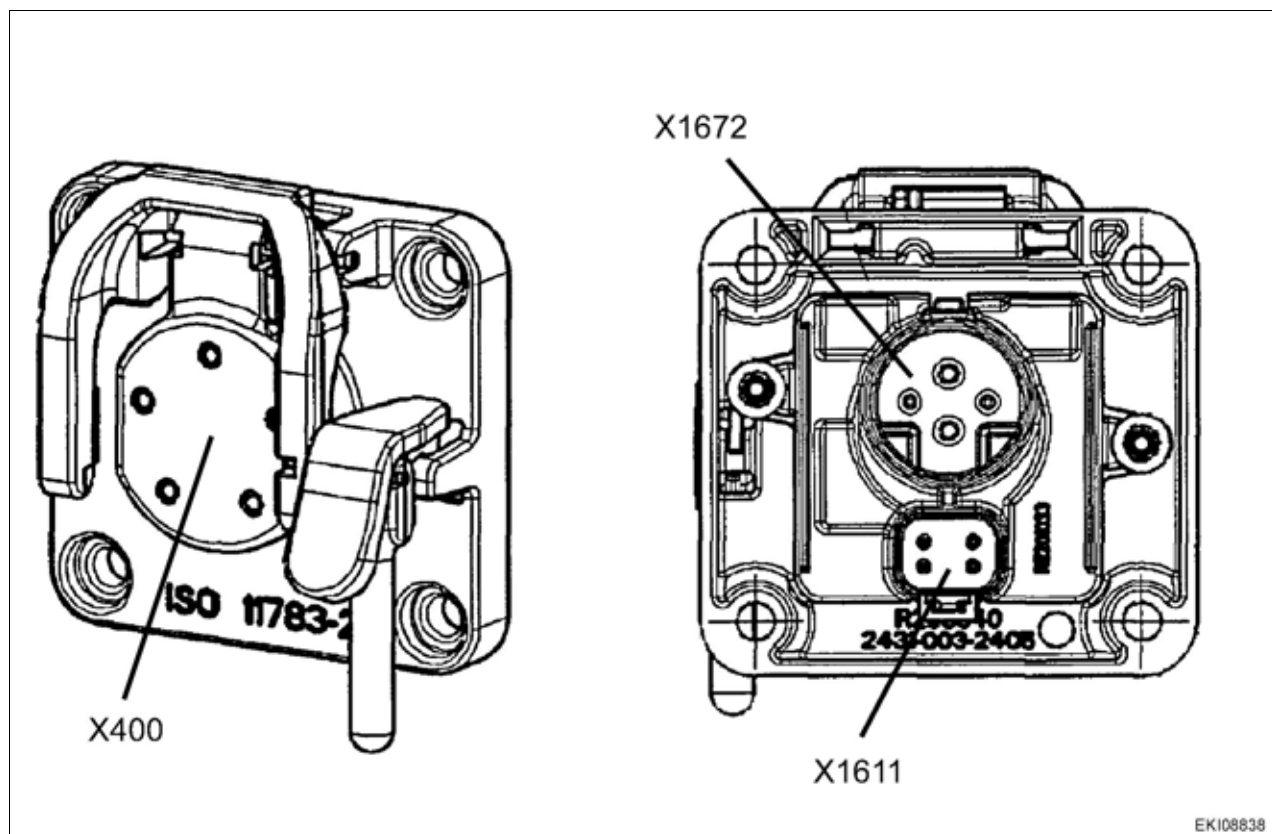


Fig. 489.

EKI08838

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)

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

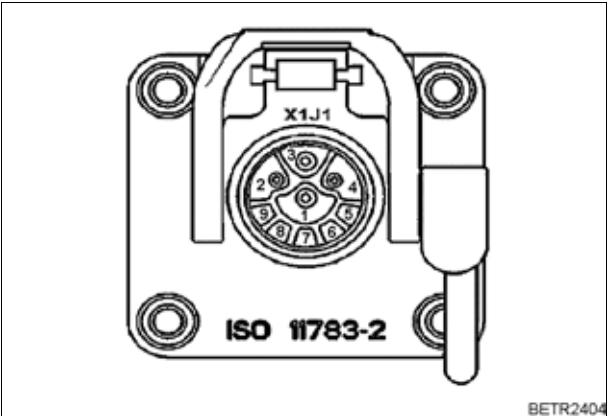


Fig. 490.

BETR2404
I002970



Fig. 491.

EK107745
I002974

Circuit diagram: ISO bus

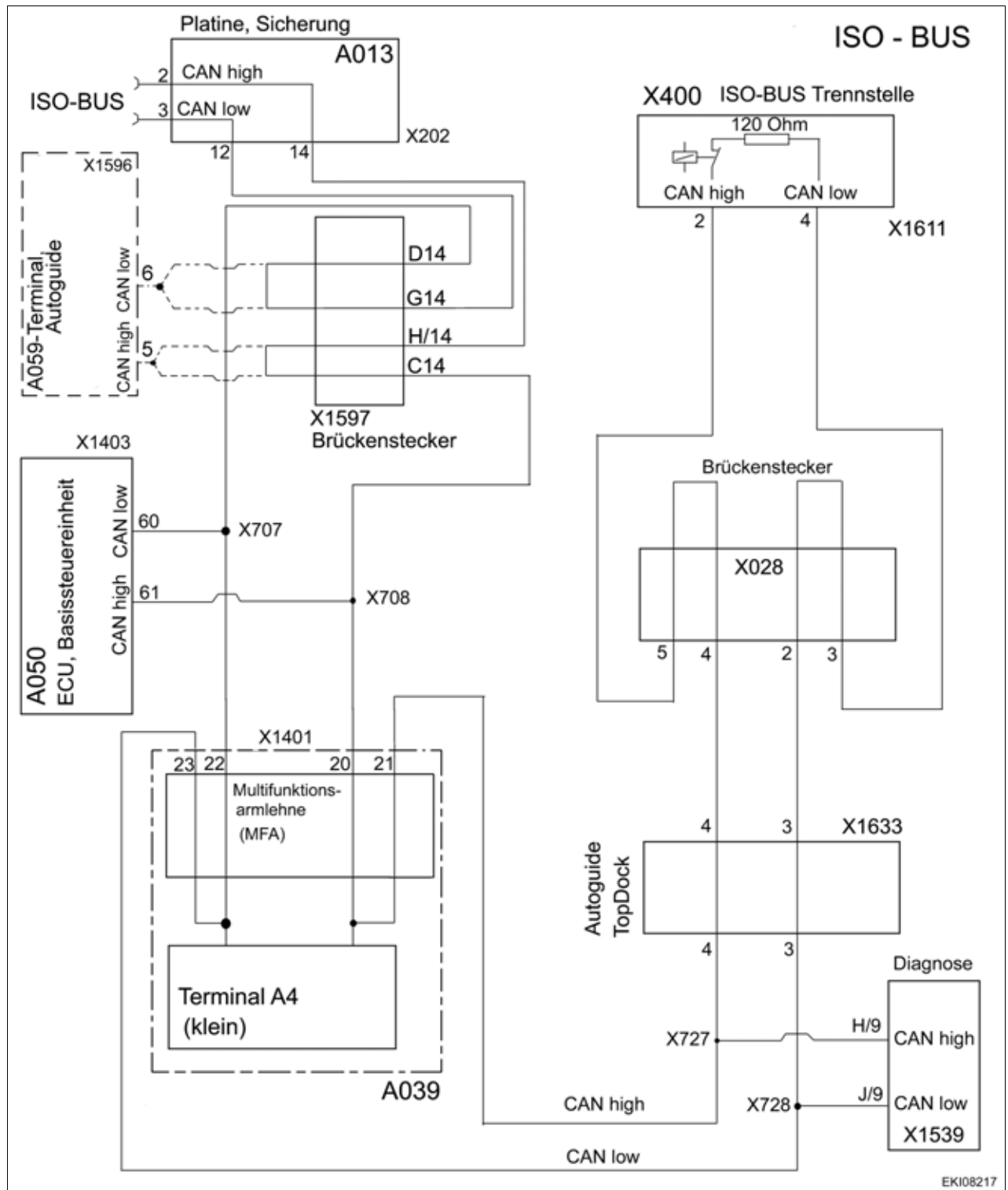


Fig. 492.

EKI08217

I001189

NOTE: see §20

123 X1048 ABS socket (anti-lock system on trailer)

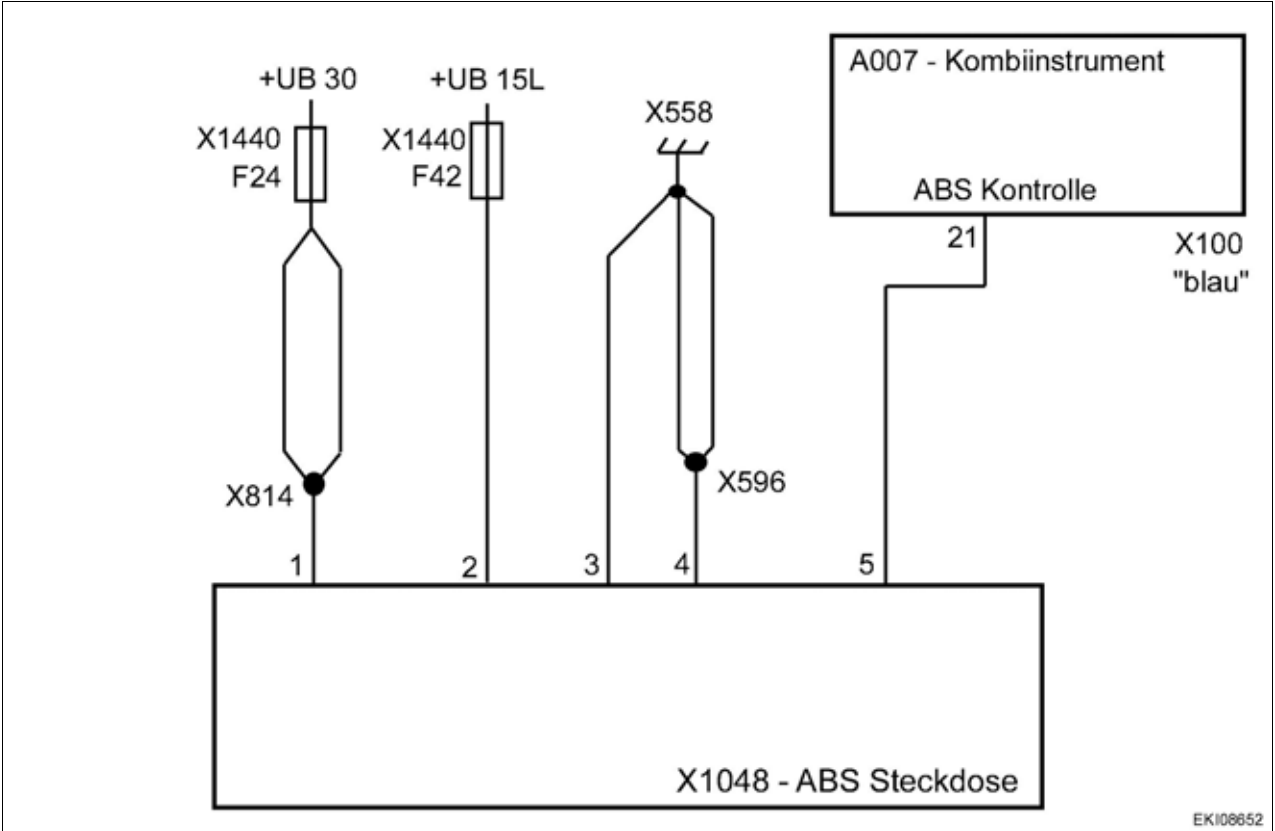


Fig. 493. EKI08852
1002519

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)

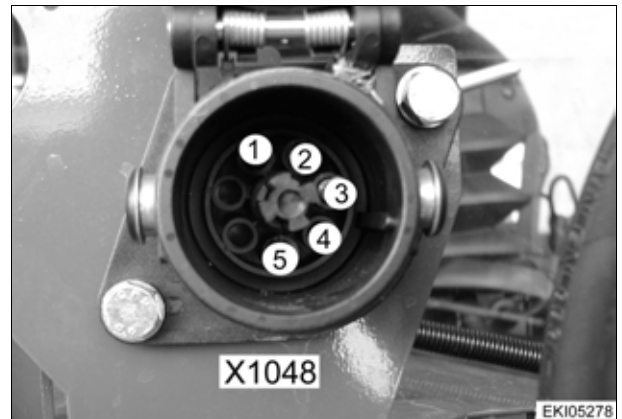


Fig. 494.

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

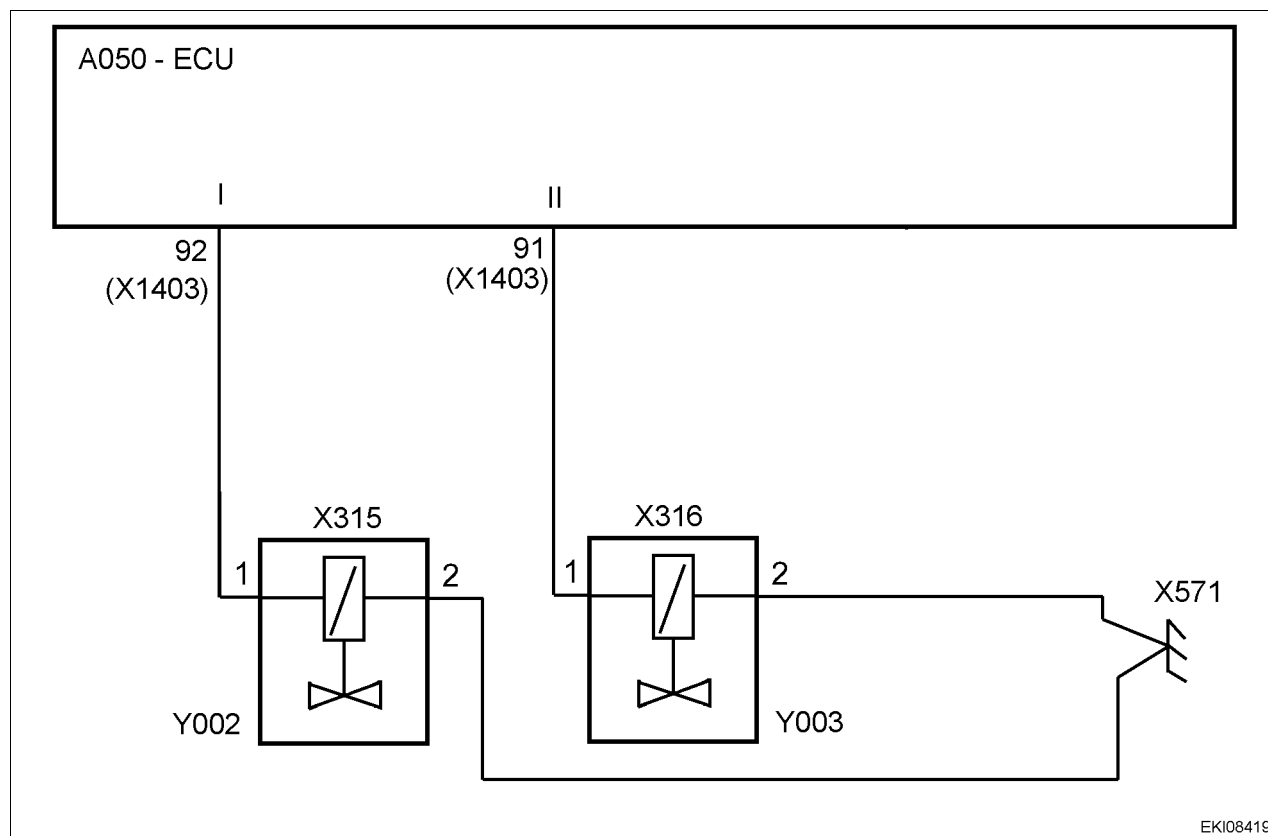


Fig. 495.

EKI08419
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

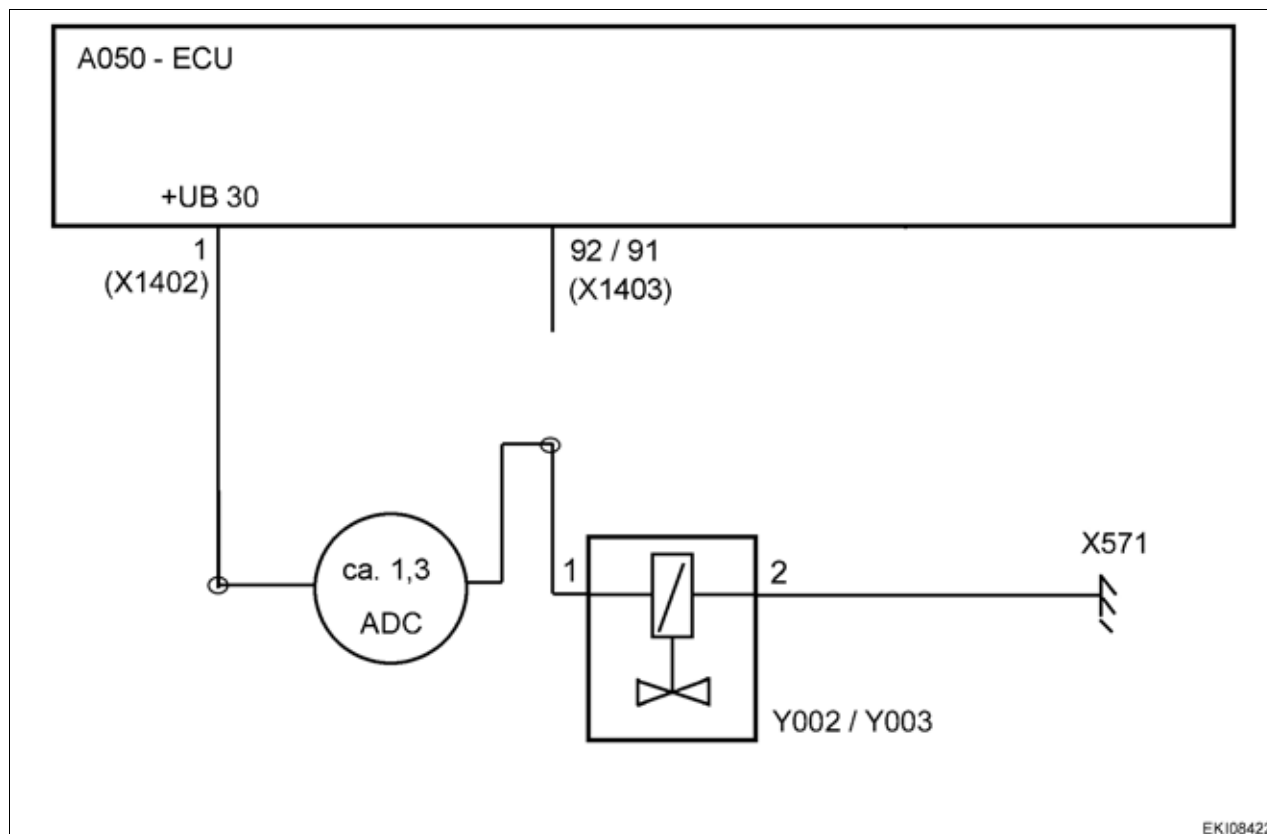


Fig. 497.

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).

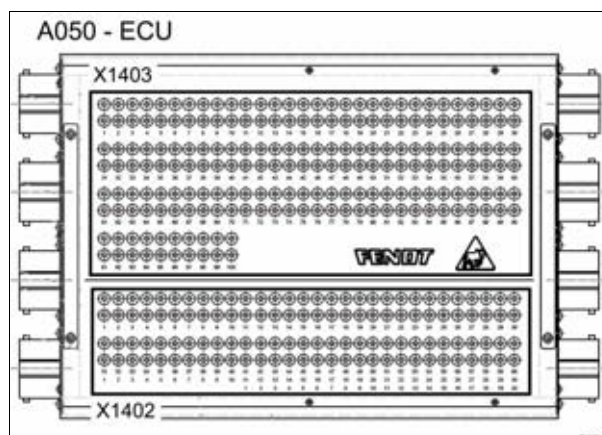


Fig. 498.

1001874

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

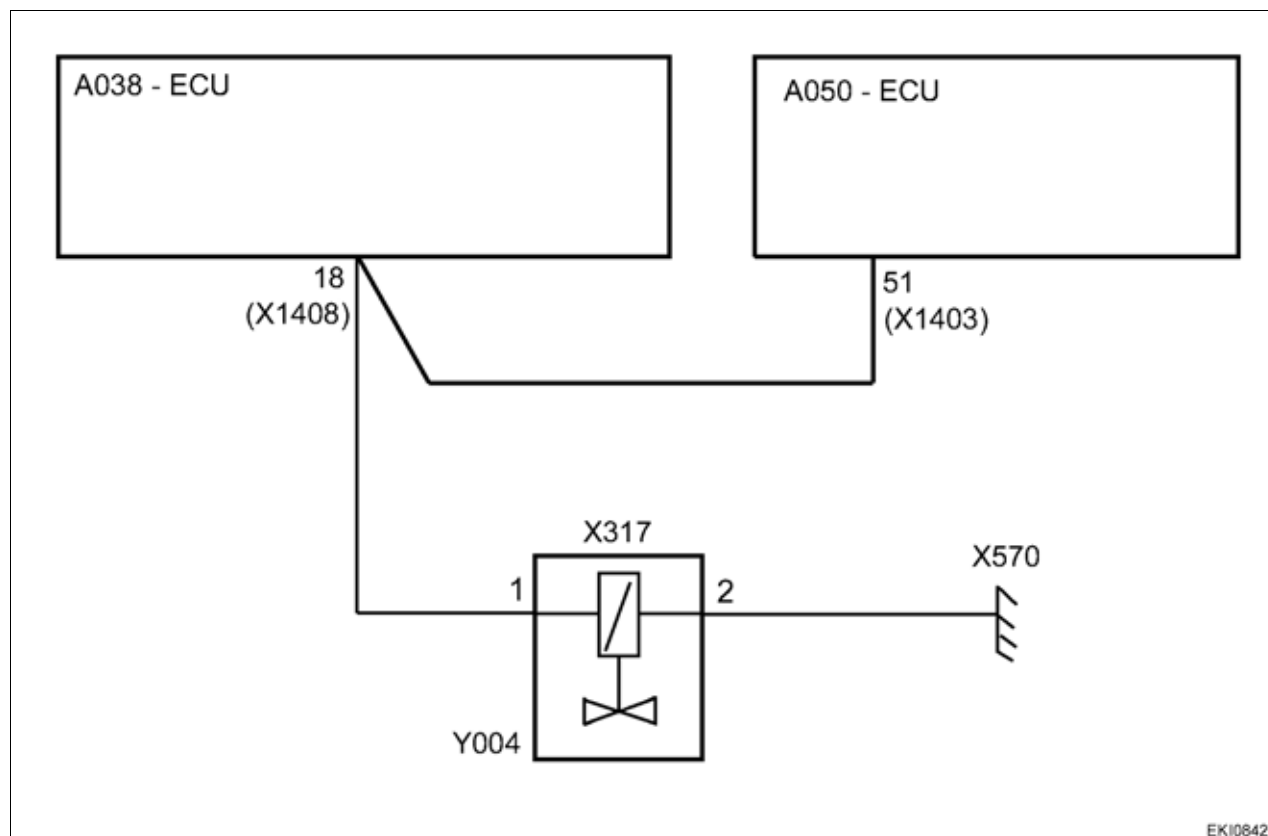


Fig. 499.

EKI08421
 1001996

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

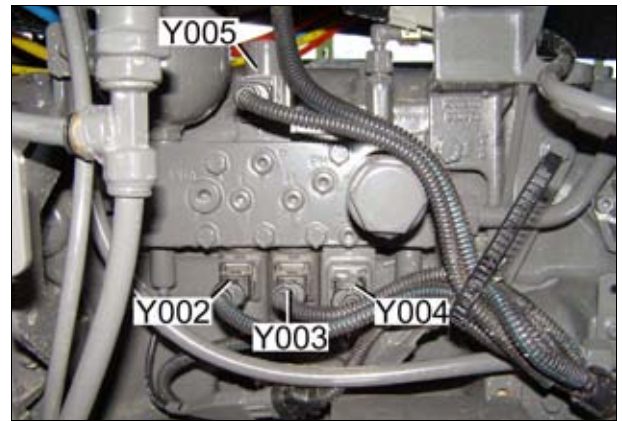


Fig. 500.

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).

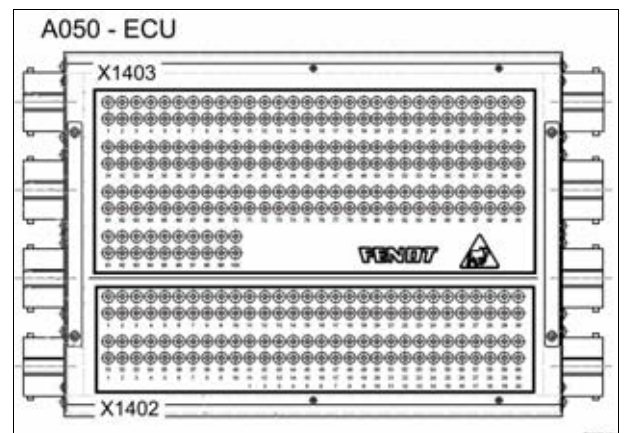


Fig. 501.

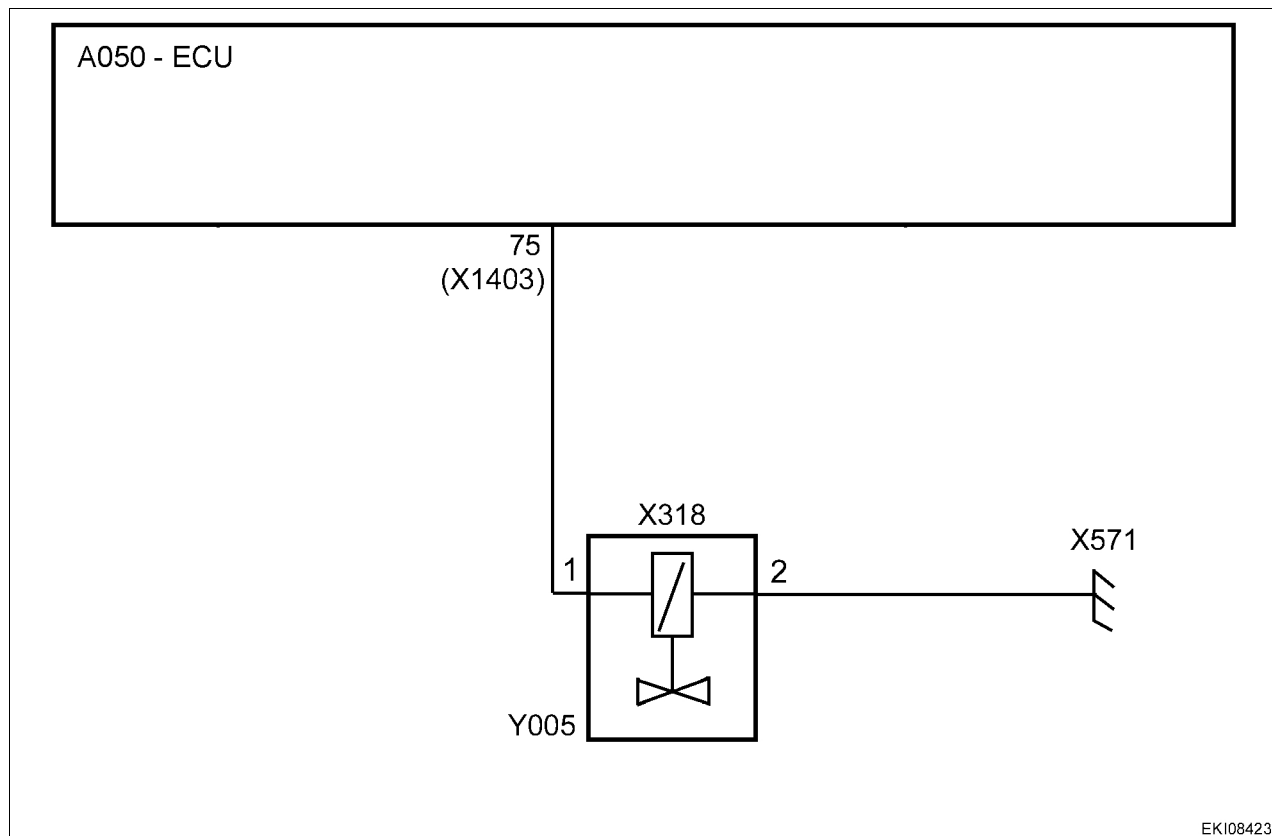
I001874

Engine speed	Current draw (no gear ratio pre-selected)	Current draw (gear ratio pre-selected)	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

EKI08423

I002004

Fig. 502.

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 on Y005	
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

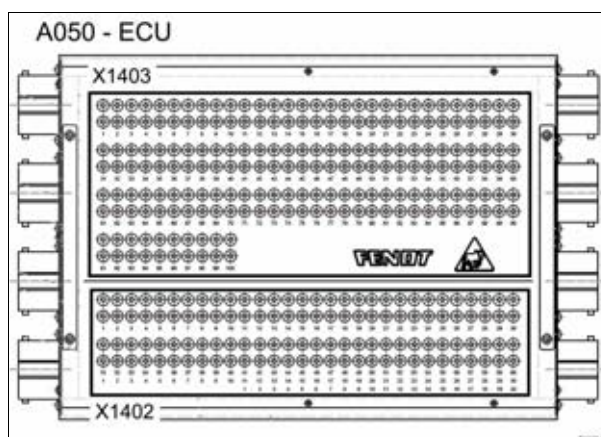
Connect the X899.980.304.000 adapter box to the **A050** - ECU, basic control unit.Open **pin 75** (on X1403) and connect a multimeter (ammeter)

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

470
T000623
 Version 2
 04-09-2009

 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-

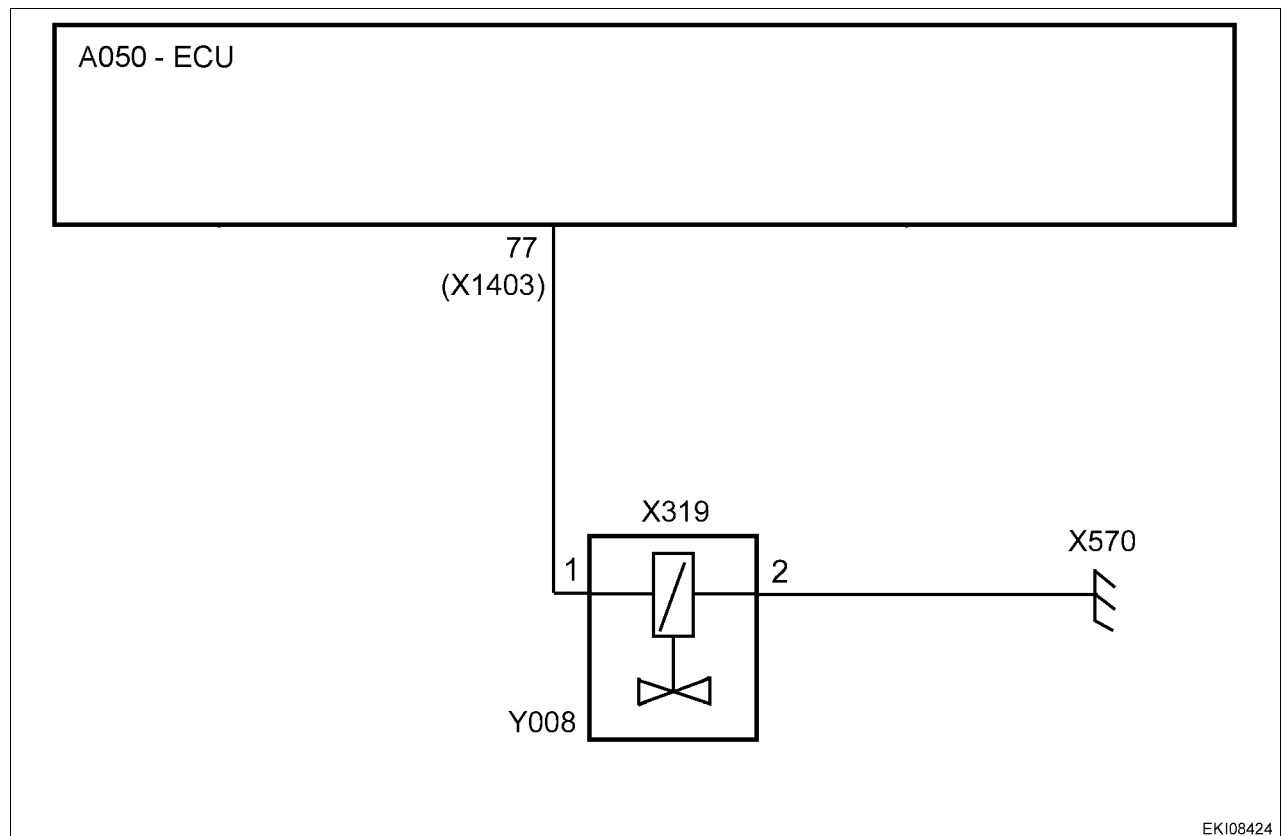
127 Y008 solenoid valve, rear PTO (clutch)

Fig. 505.

EKI08424

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

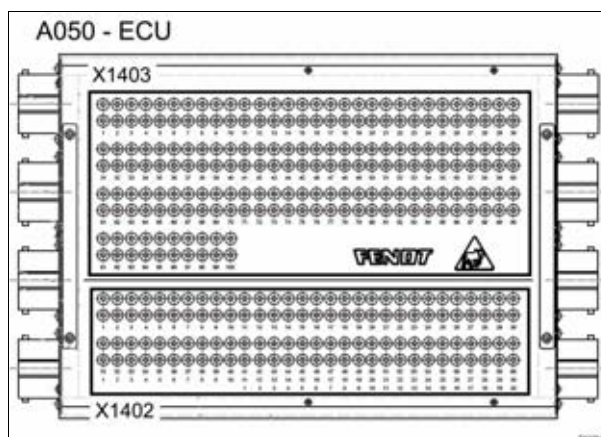


Fig. 507.

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

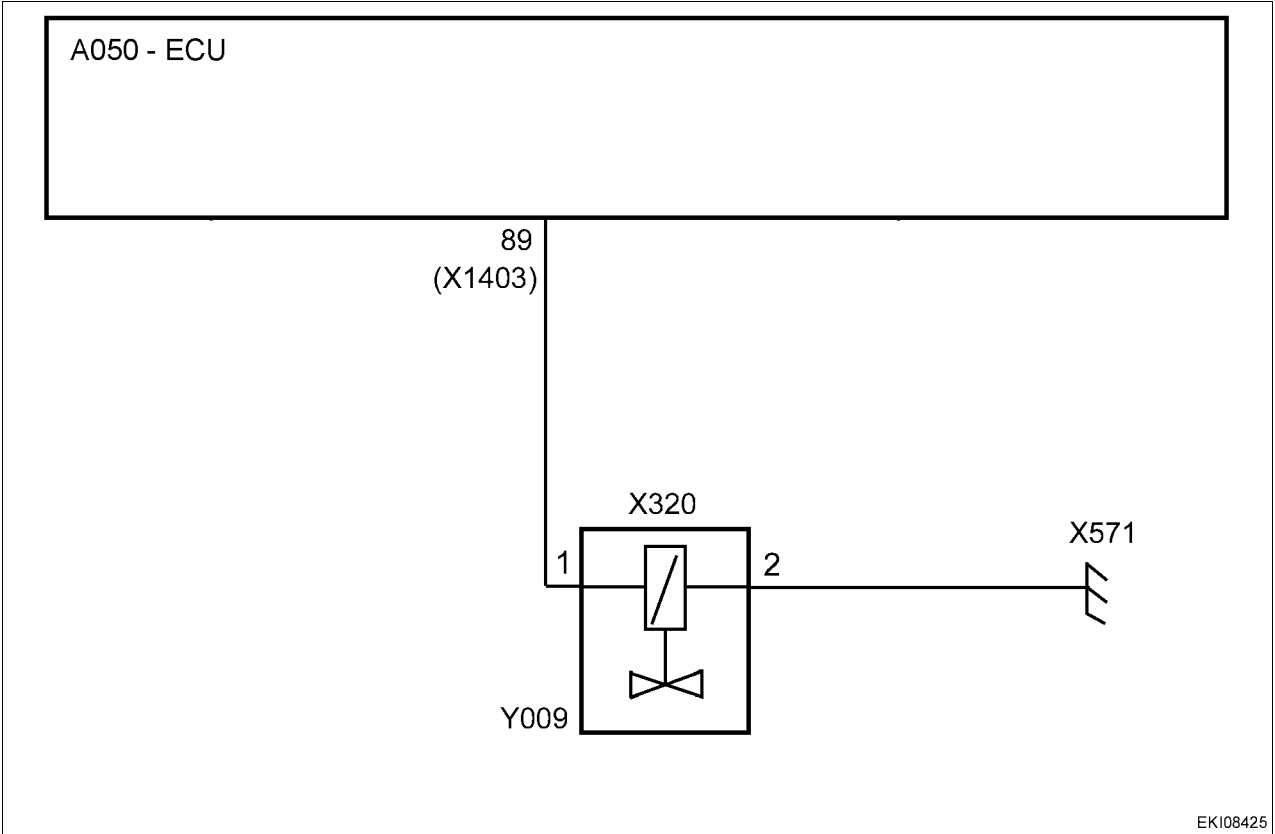


Fig. 508.

EKI08425
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.

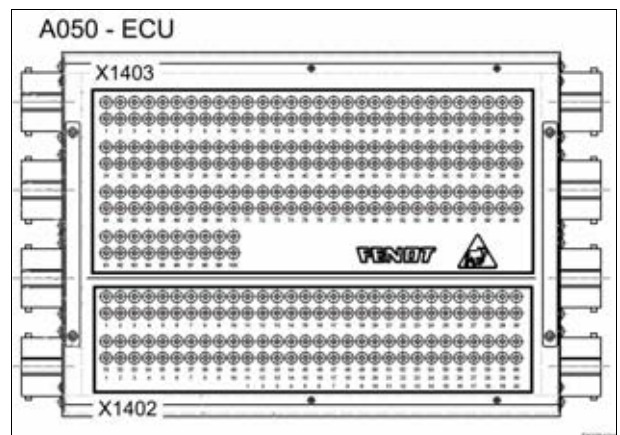


Fig. 510.

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](#)

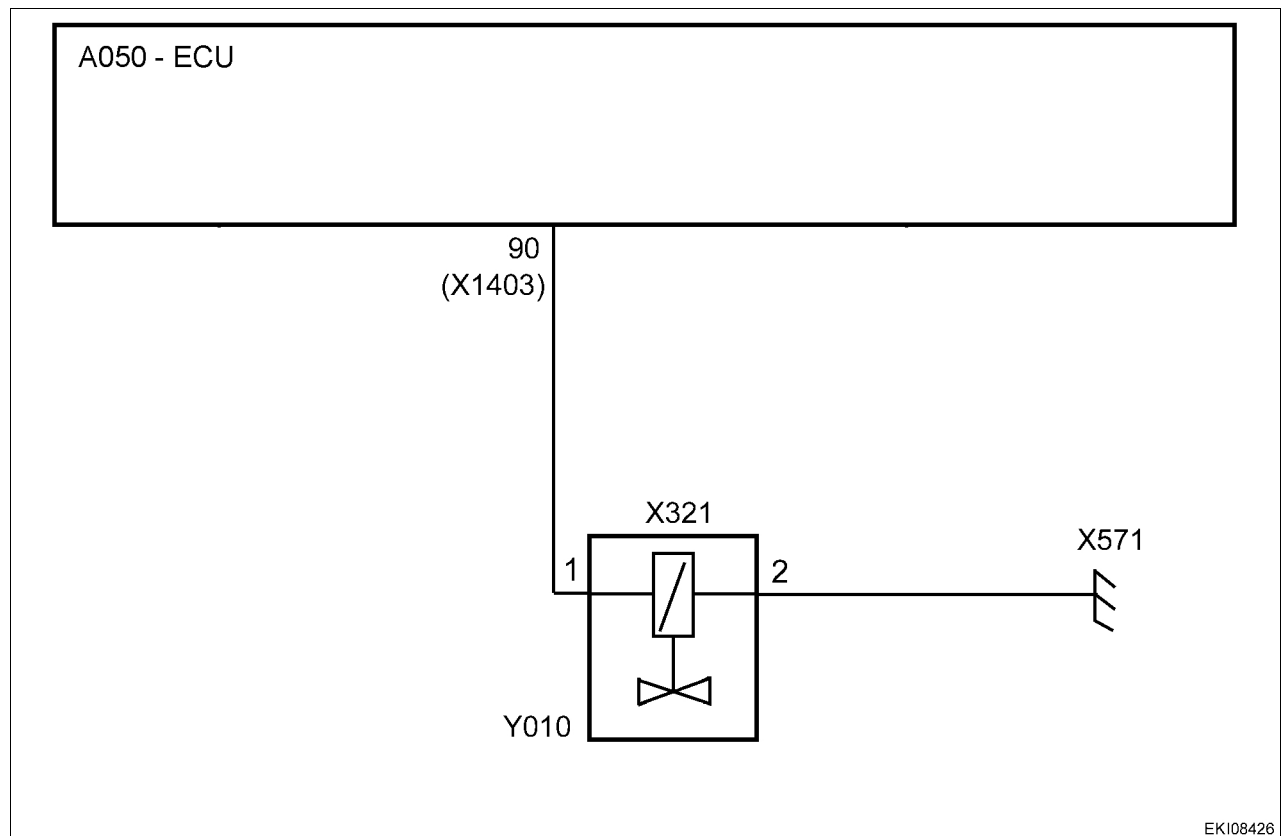
129 Y010 solenoid valve, differential lock

Fig. 511.

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.

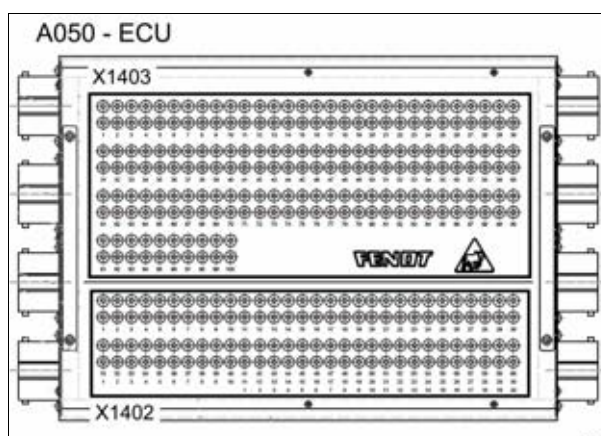


Fig. 513.

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

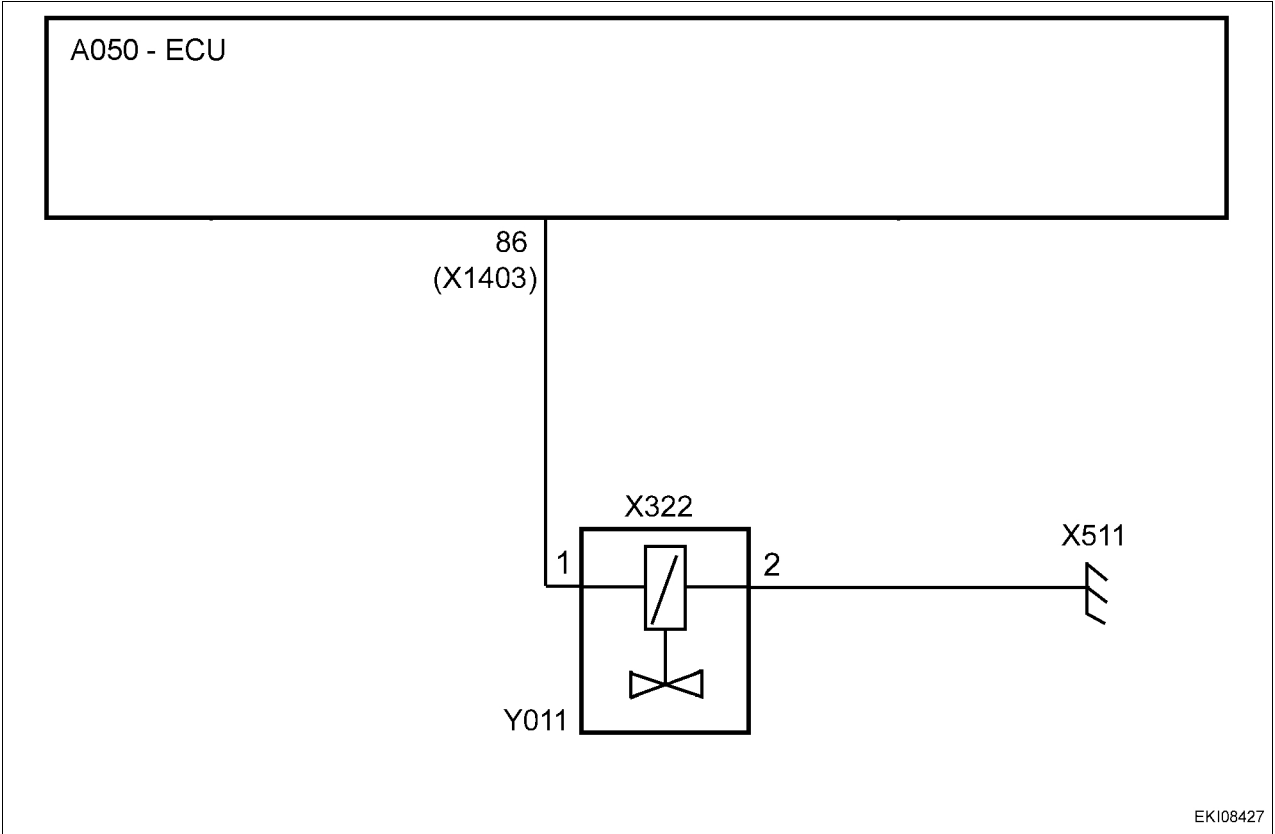


Fig. 514.

EKI08427
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.

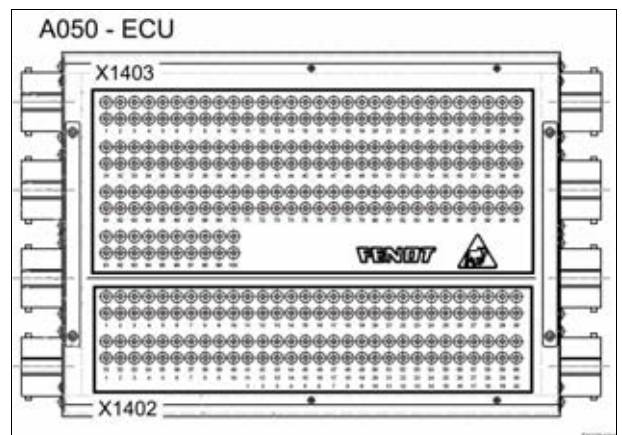


Fig. 516.

I001874

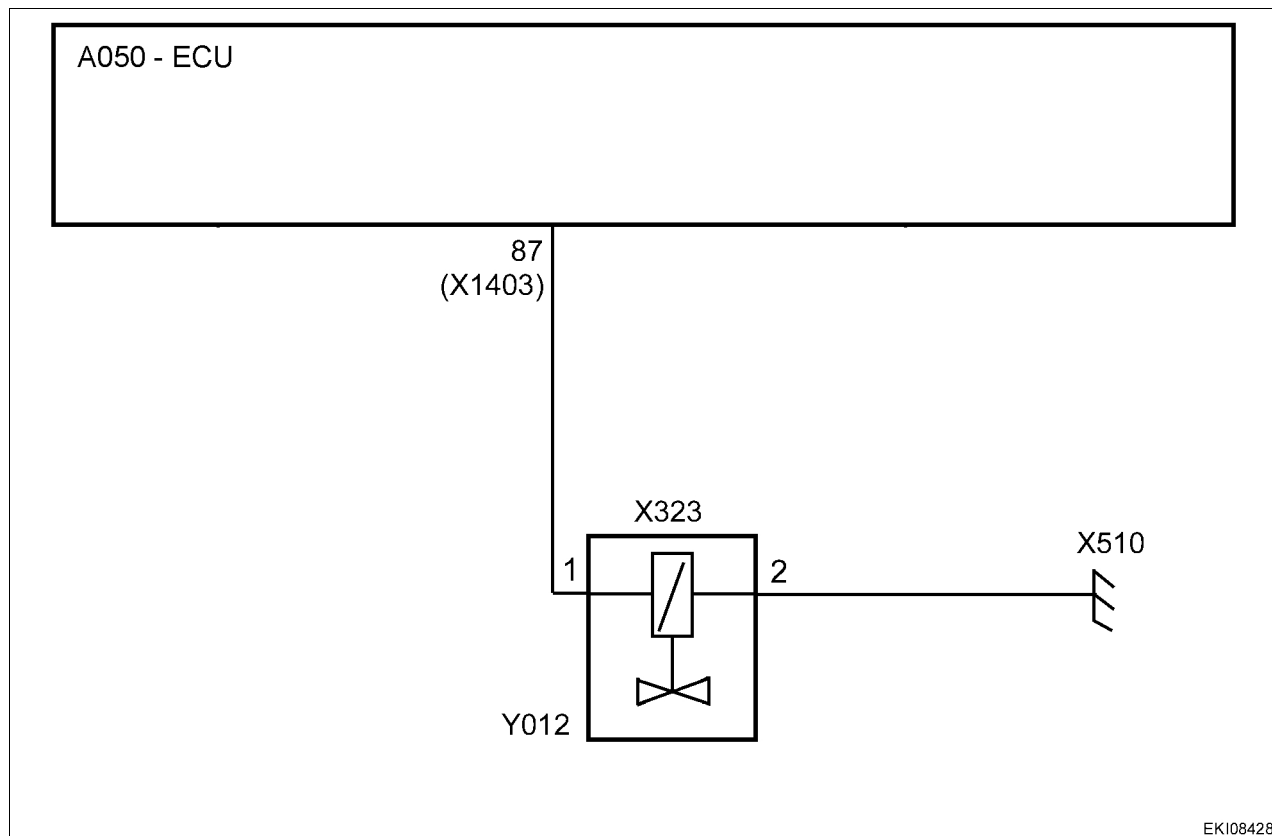
Test	Pin	Specified value	condition	Possible cause of fault
Actuation	86			
		1.7 ADC	Switch position ON	
		0 ADC	Switch position OFF	

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

EKI08428

I002026

Fig. 517.

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.

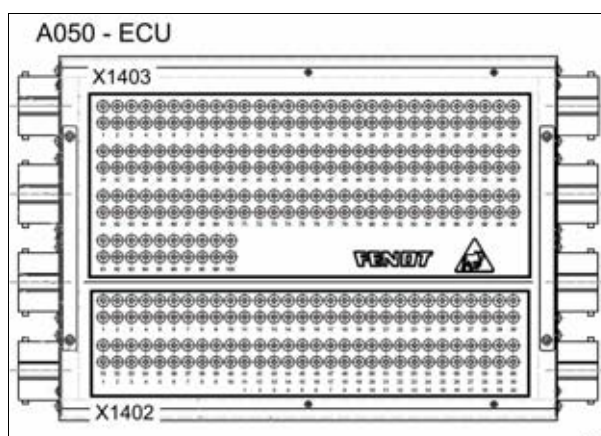


Fig. 519.

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.

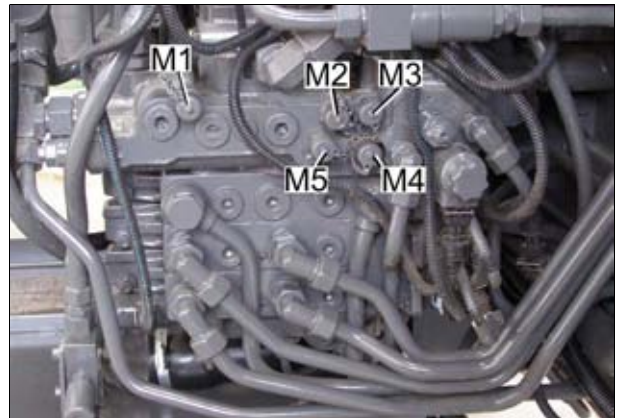
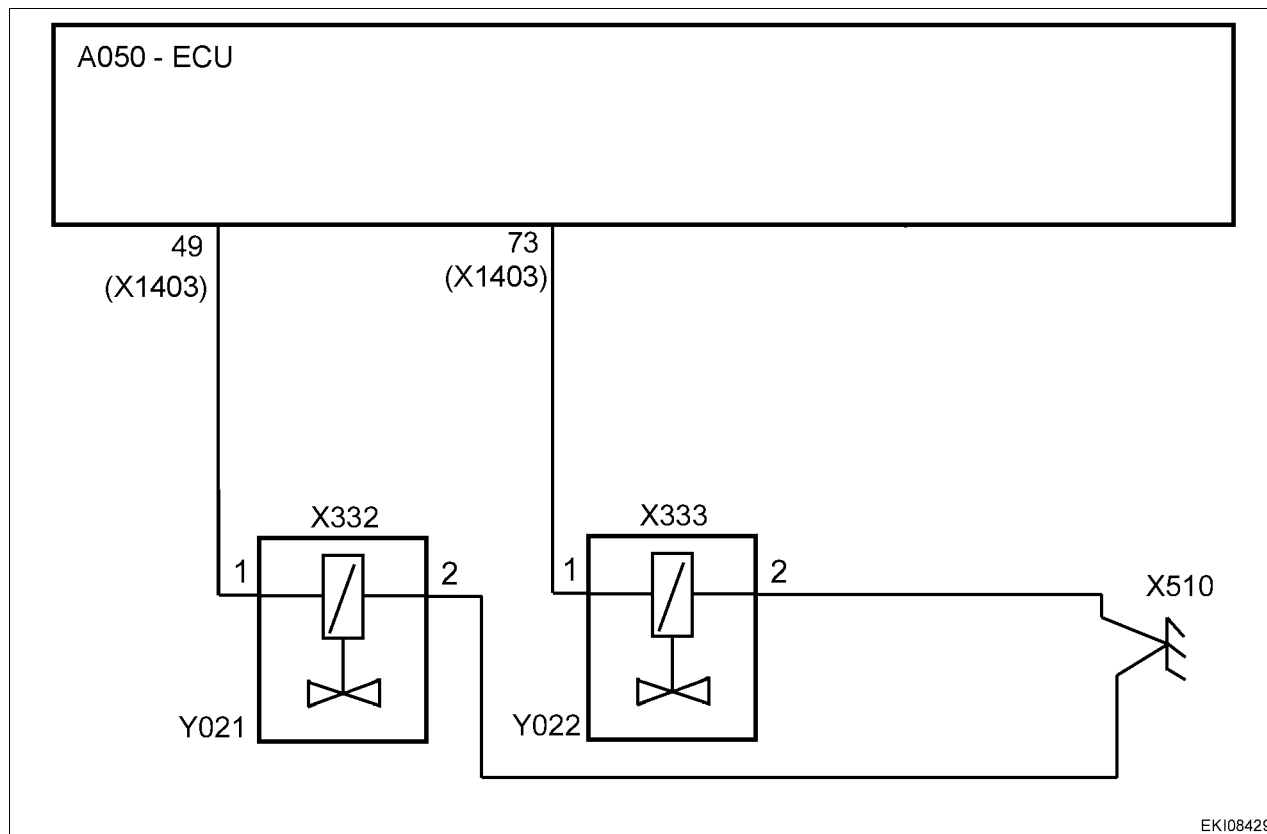


Fig. 520.

1001210

132 Y021/Y022 raise/lower solenoid valve (standard front power lift)



EKI08429

Fig. 521.

1002027

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

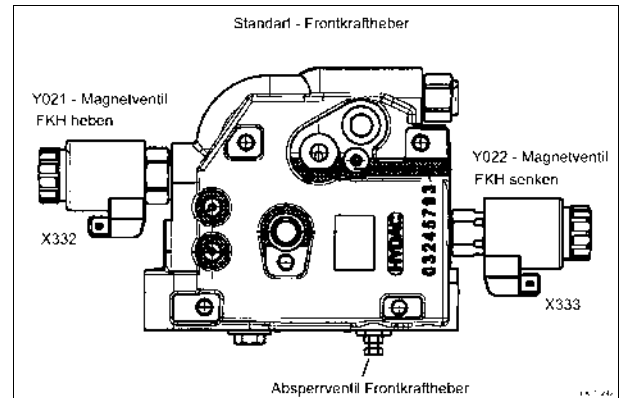


Fig. 522.

1001306

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.

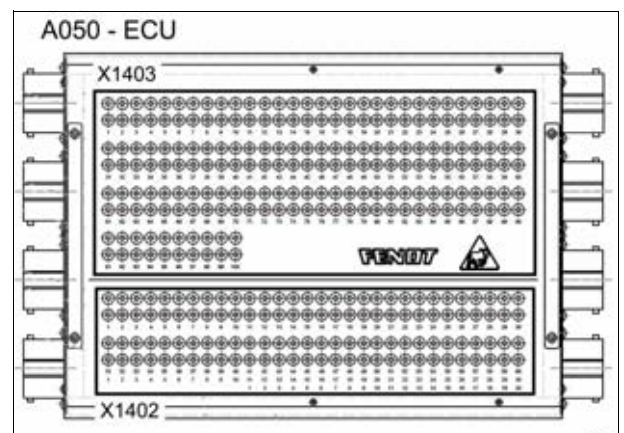


Fig. 523.

1001874

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	

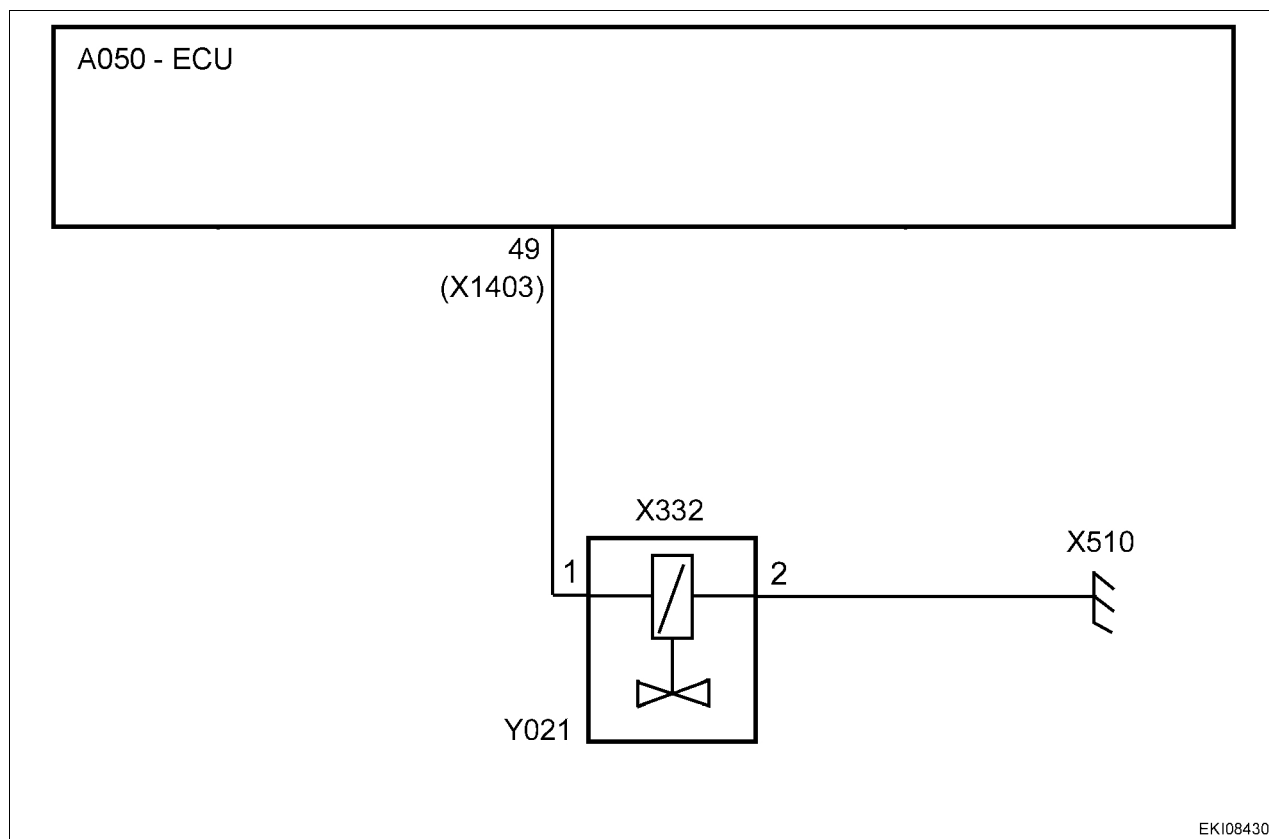
Measuring point on the A050 - ECU, basic control unit (X1403 separation point)

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.



EK108430

I002061

Fig. 524.

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

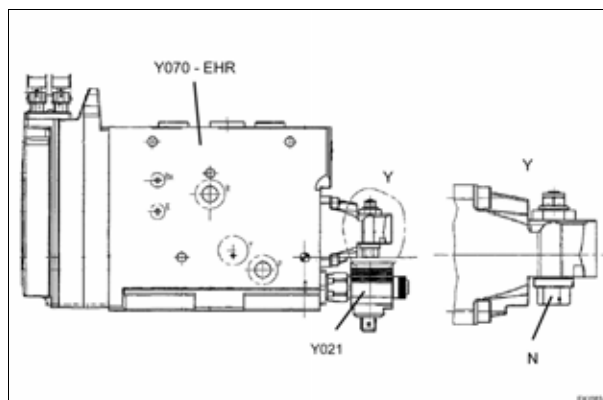


Fig. 525.

1001893

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.

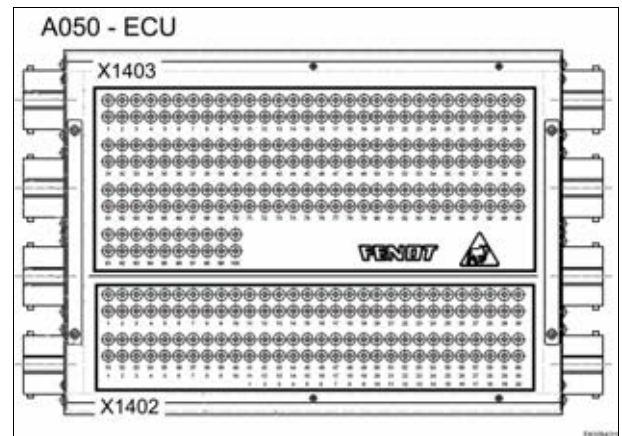


Fig. 526.

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)

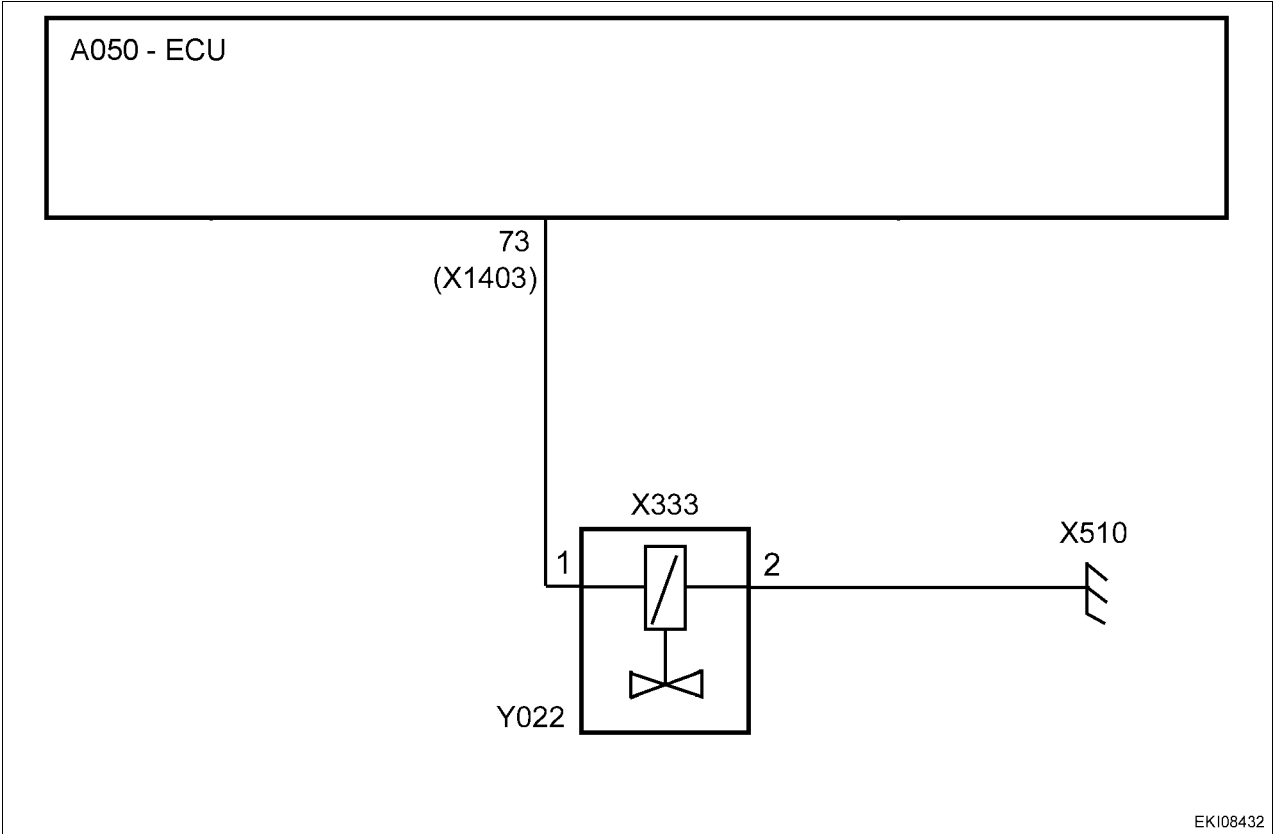


Fig. 527.

EKI08432
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.

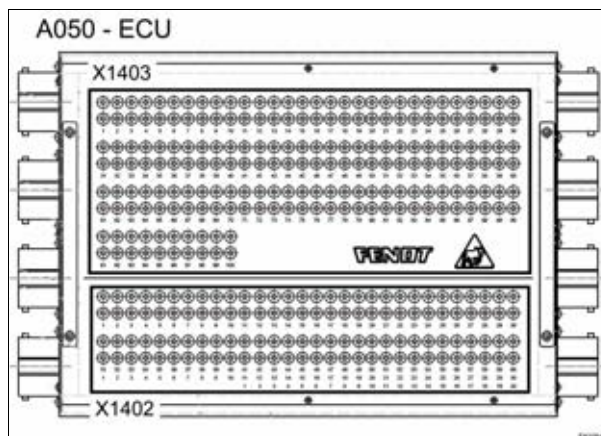


Fig. 529.

1001874

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.

NOTE: In DA mode, the maximum field pressure is limited to 50 bar.

It is not possible to jack up the tractor.

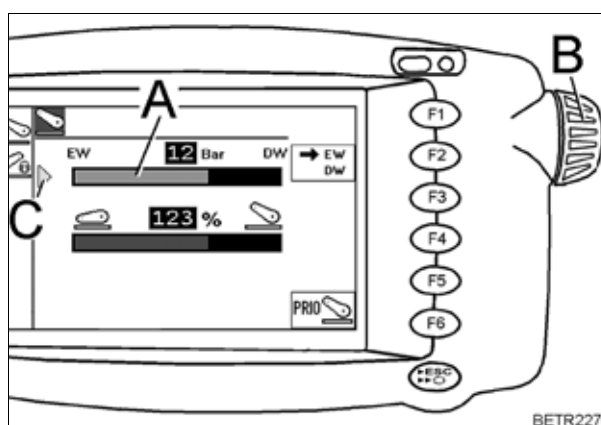


Fig. 530.

BETR2276

1004839

135 Y024 magnetic clutch, air conditioning compressor

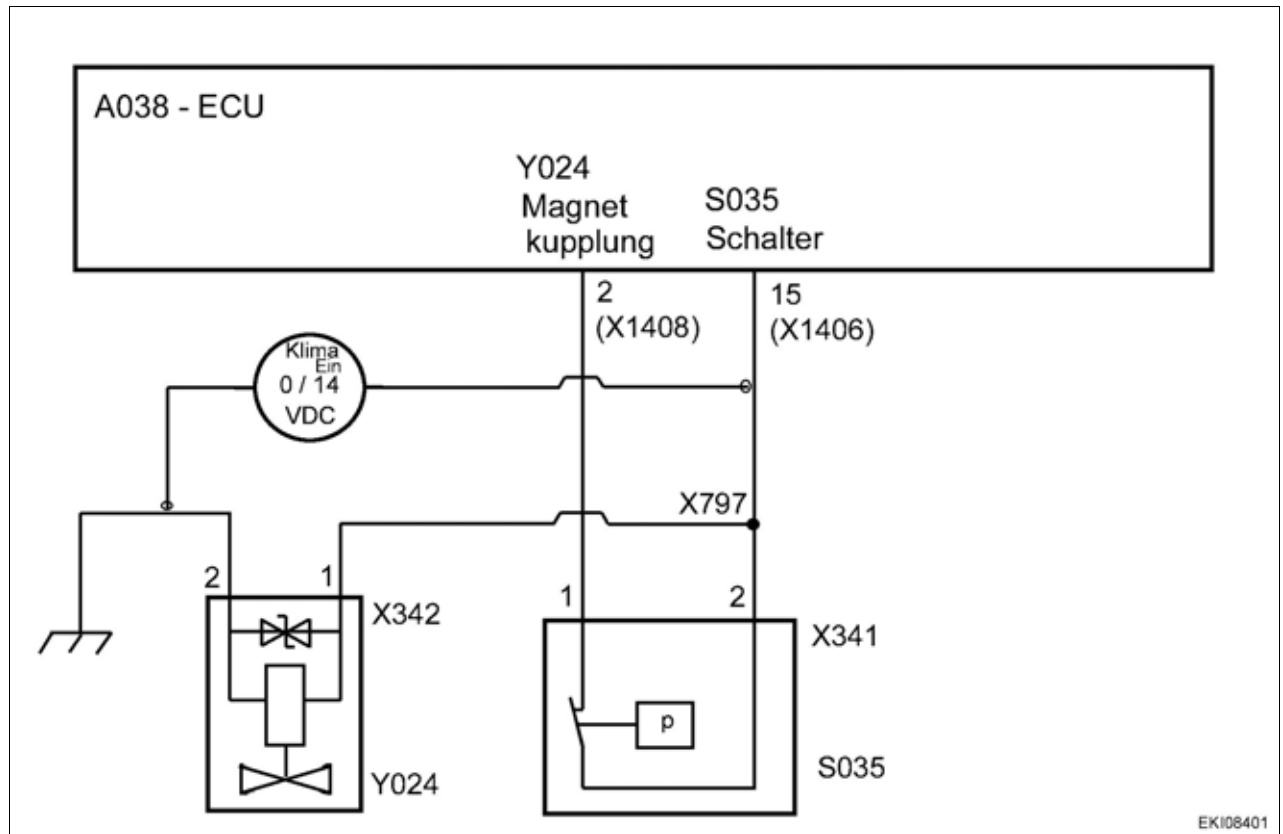


Fig. 531.

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.

1001163

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.

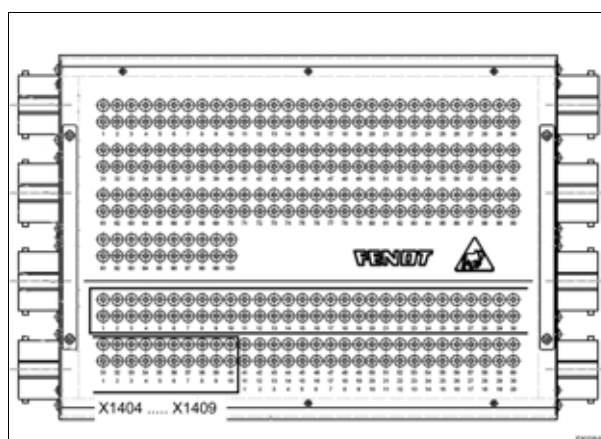


Fig. 533.

1002060

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*

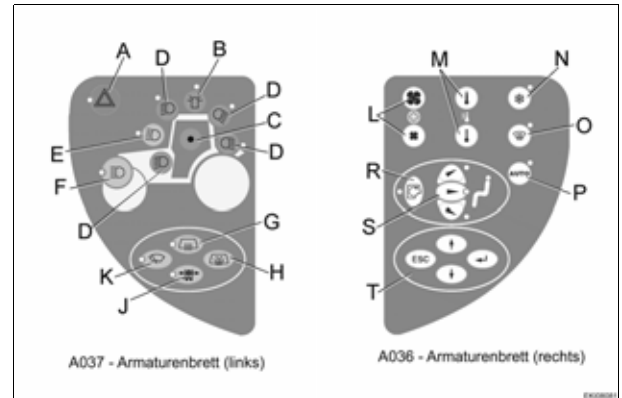


Fig. 534.

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

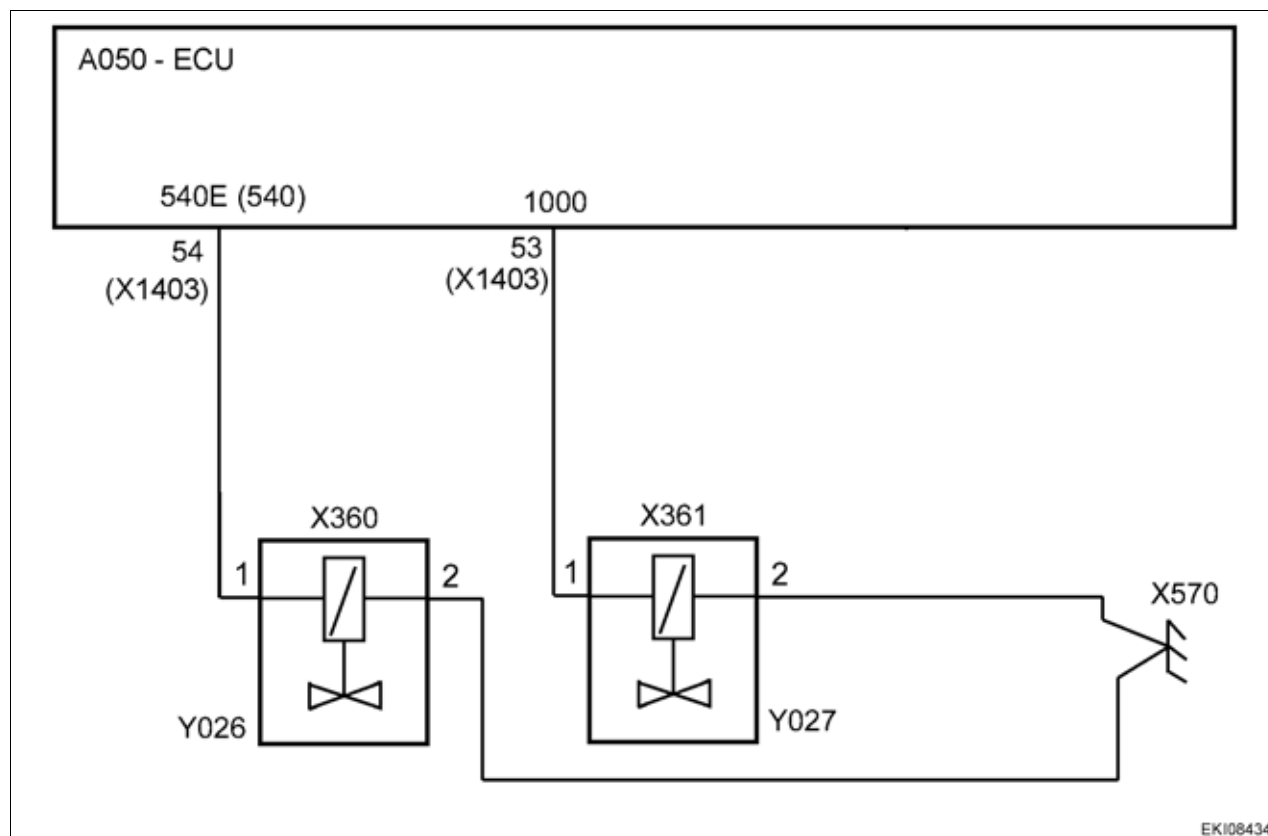


Fig. 535.

EKI08434
1002065

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.

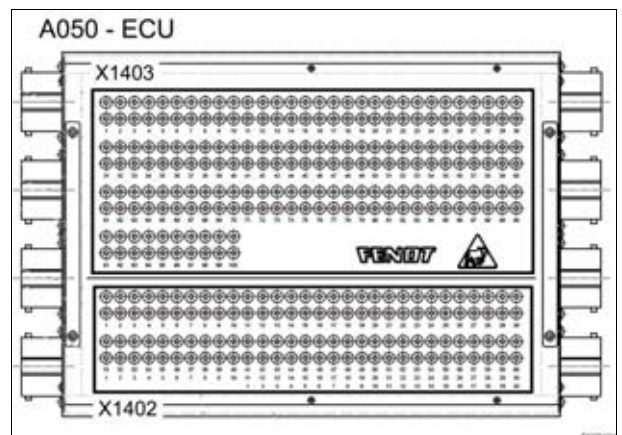


Fig. 537.

I001874

Y026 - Solenoid valve, rear PTO, stage I

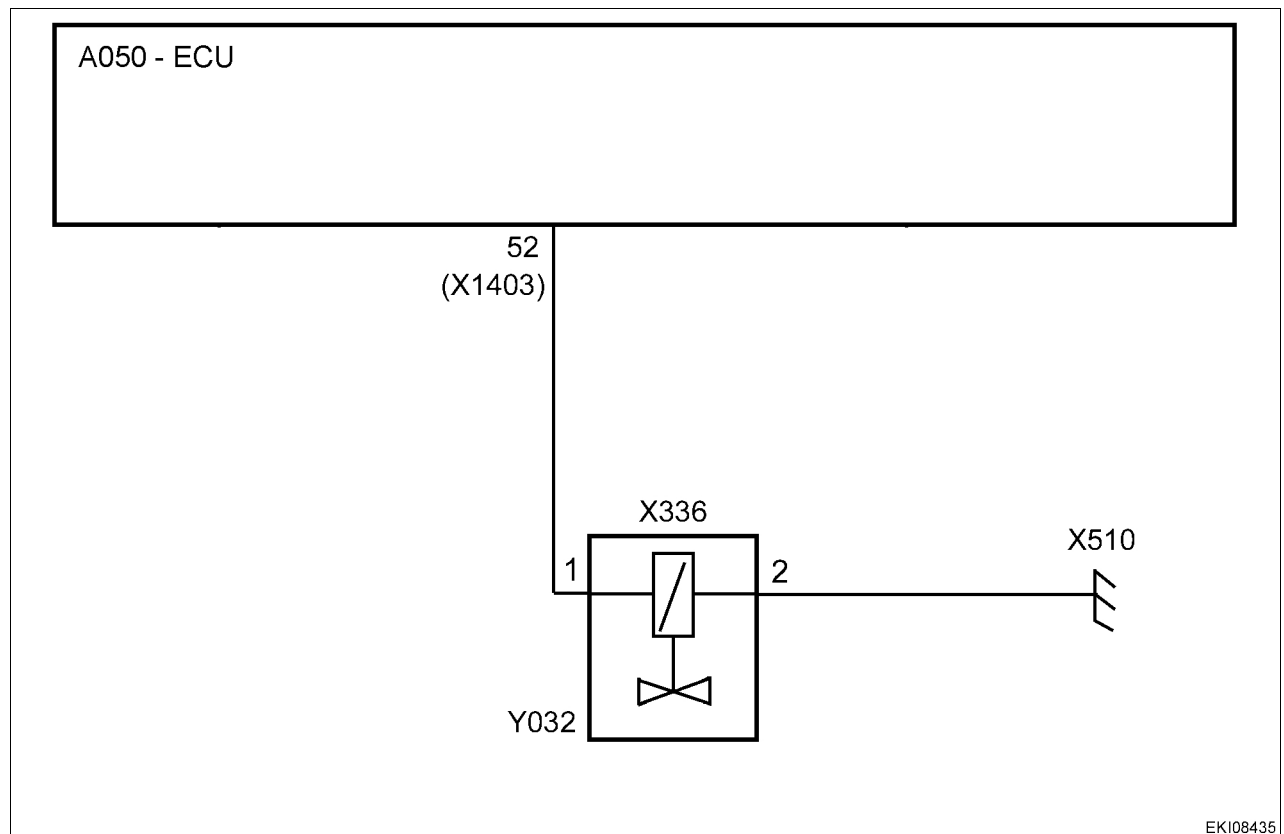
Test	Pin	Specified value	condition	Possible cause of fault
Actuation	54	1.5 ADC	Switch position ON	
		0 ADC	Switch position OFF	

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

EKI08435

I002066

Fig. 538.

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.

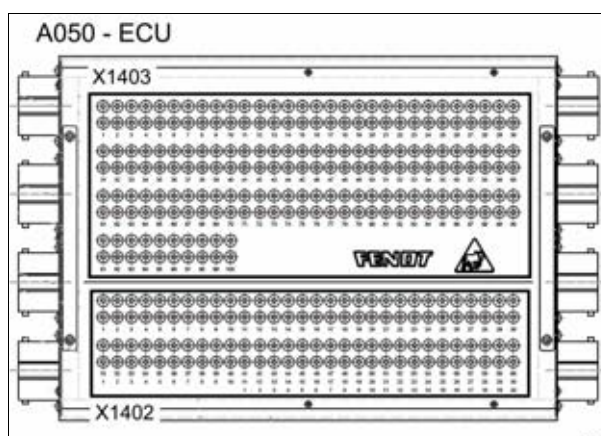


Fig. 540.

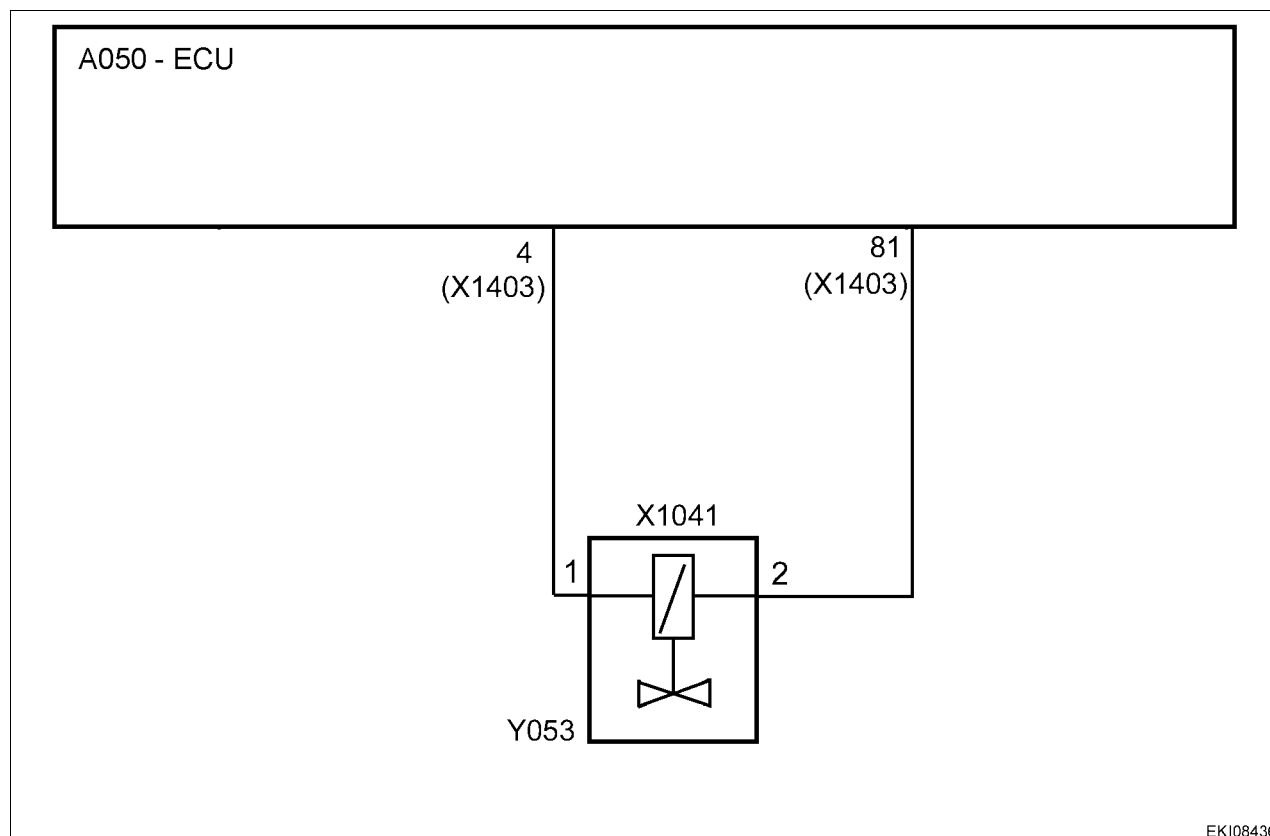
I001874

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



EKI08436

Fig. 541.

1002067

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.

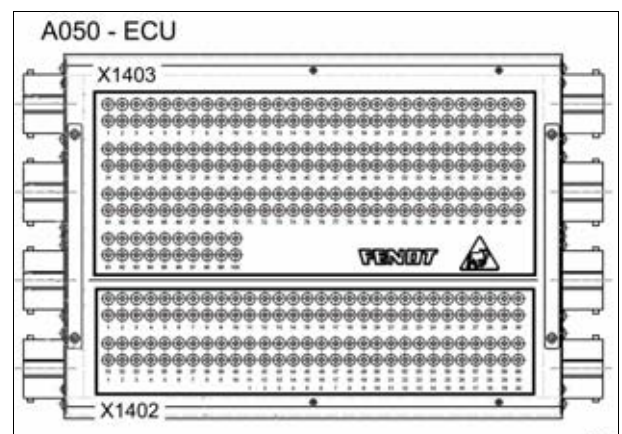


Fig. 543.

I001874

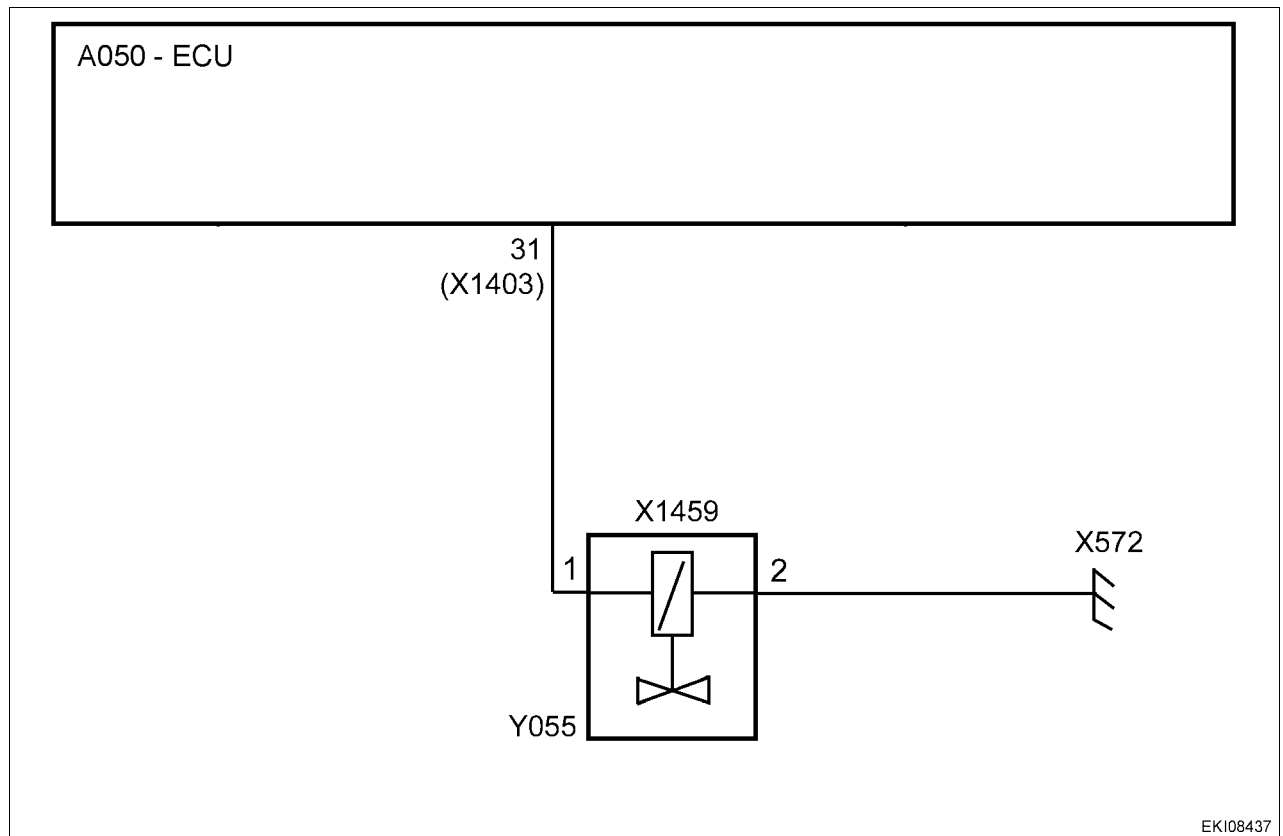
Test	Pin	Specified value	condition	Possible cause of fault
Actuation	4			
		1.5 ADC	Switch position ON	
		0 ADC	Switch position OFF	

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.



EKI08437

I002068

Fig. 544.

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.

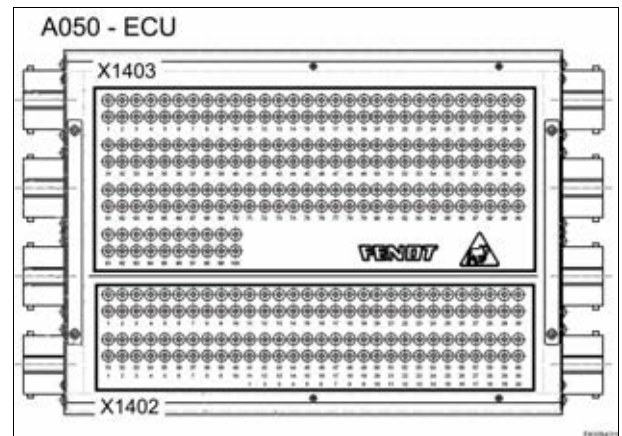


Fig. 546.

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

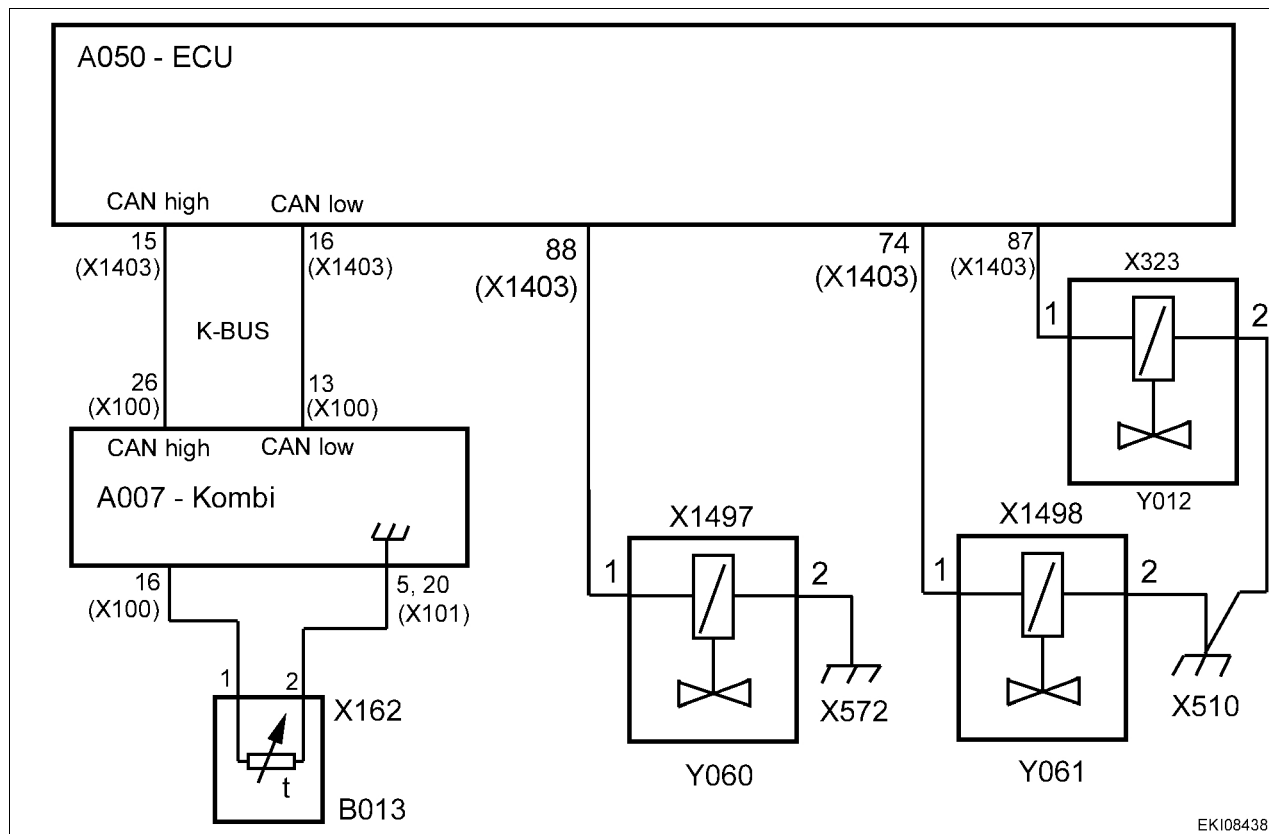


Fig. 547.

EKI08438

1002069

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

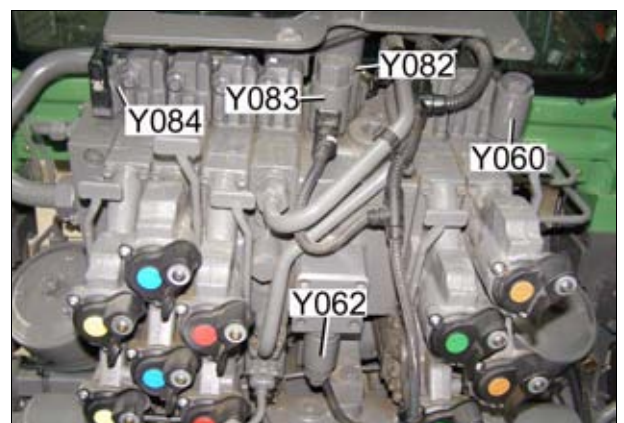


Fig. 548.

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.

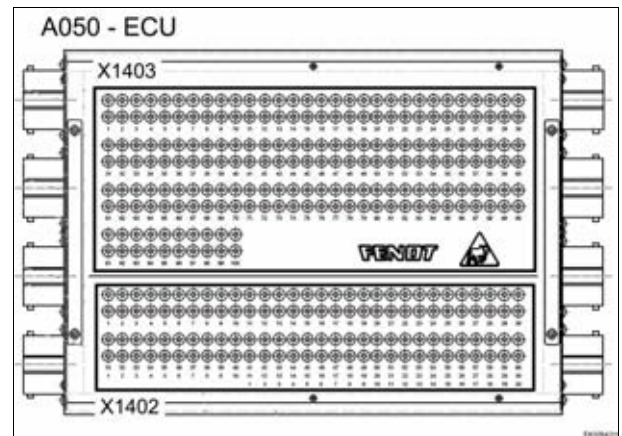


Fig. 551.

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)

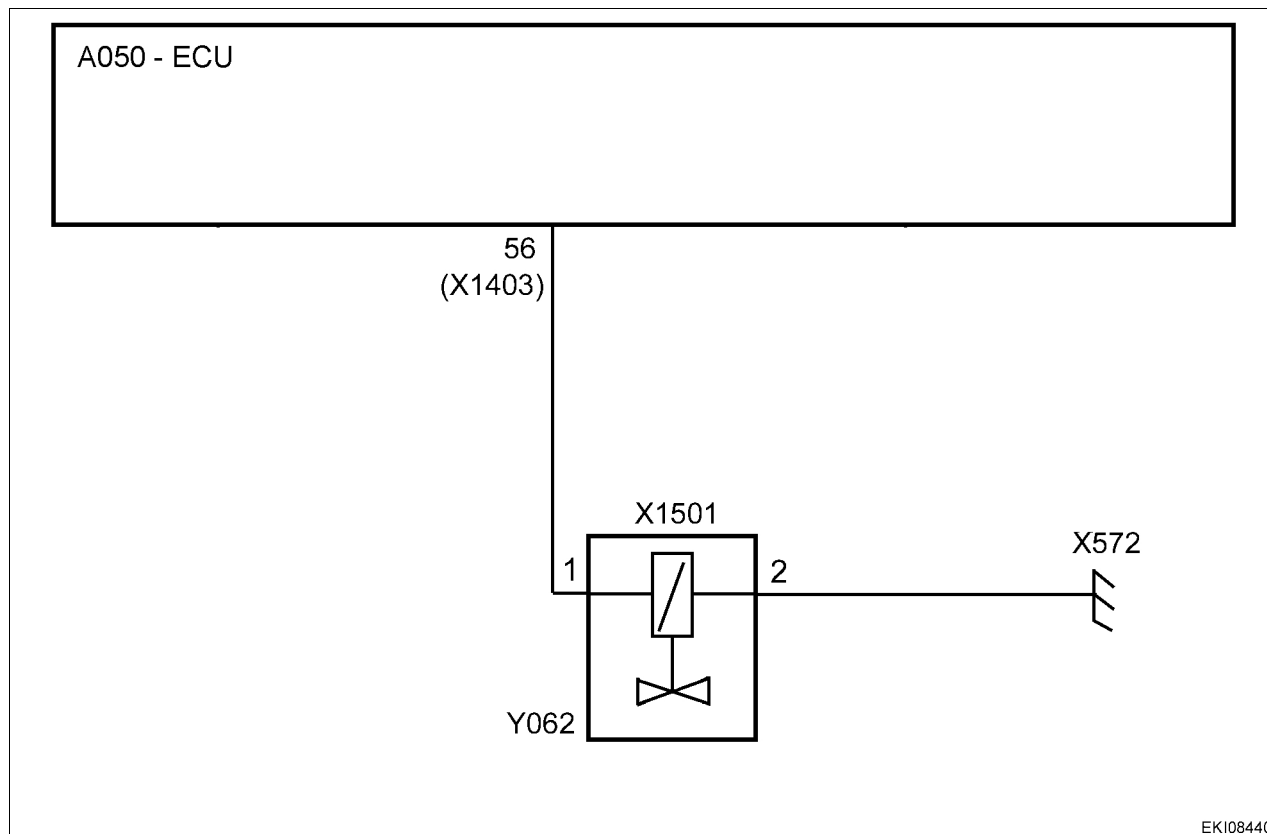
Test	Pin	Specified value	condition	Possible cause of fault
Actuation	74	1.5 ADC	Switch position ON	
		0 ADC	Switch position OFF	

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)



EKI08440

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

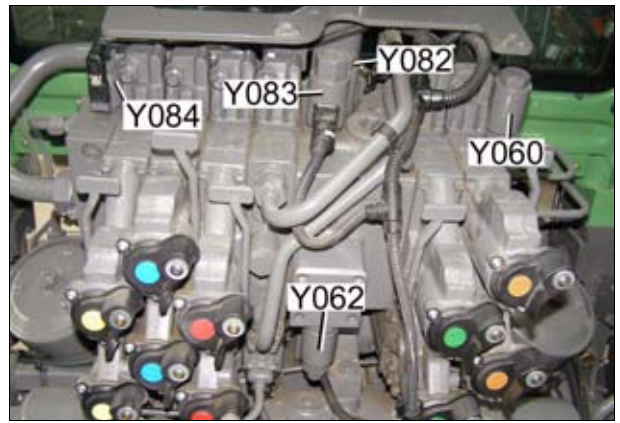


Fig. 553.

1001169

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.

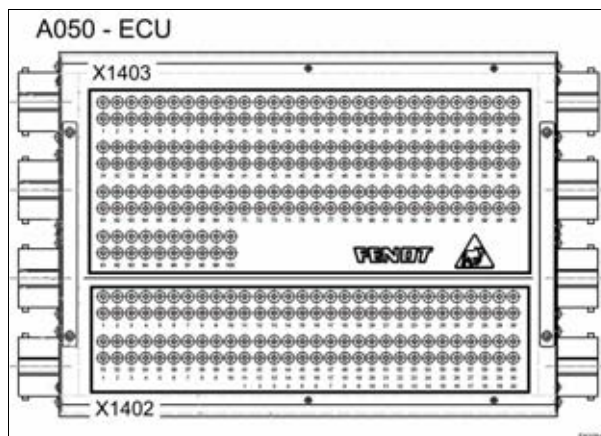


Fig. 554.

1001874

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.

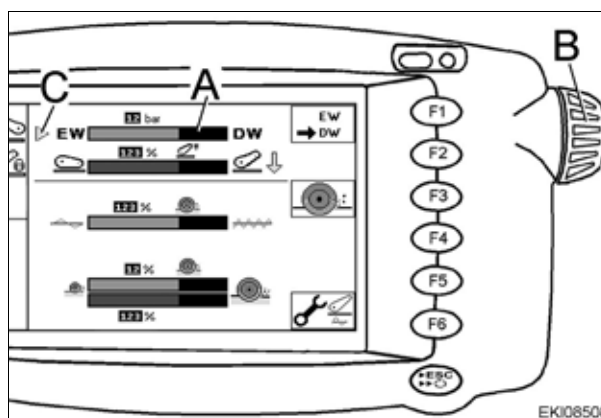
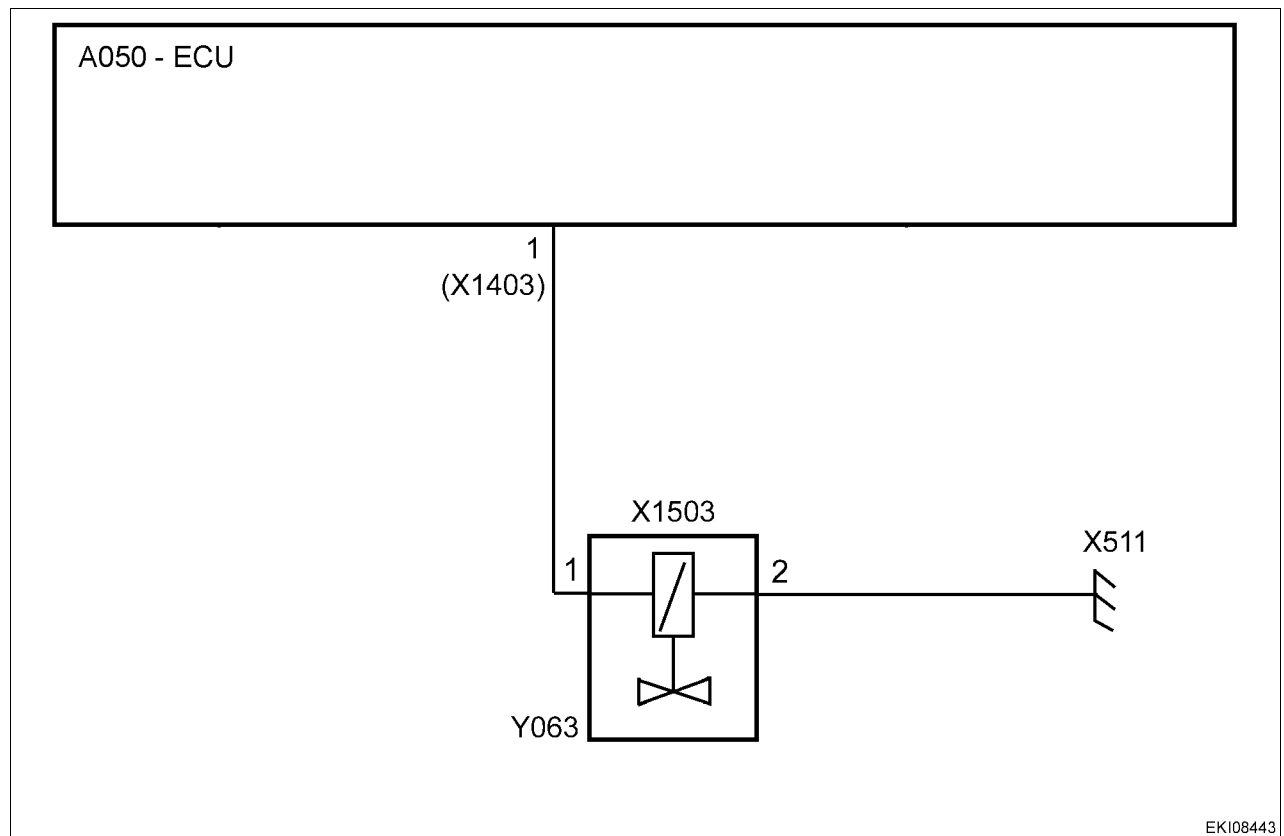


Fig. 555.

1002075

142 Y063 wobble stabiliser solenoid valve

EKI08443

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 stationary, 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.

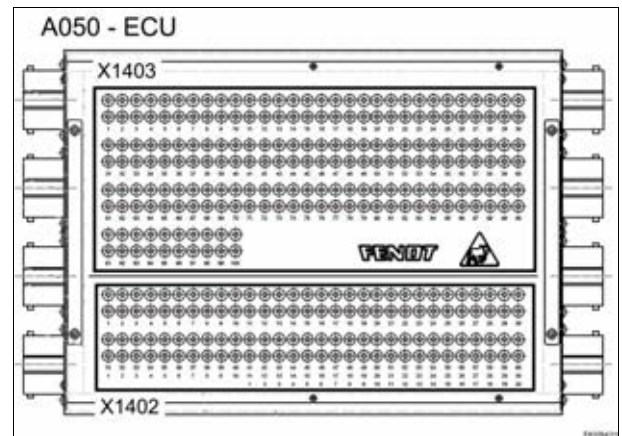


Fig. 558.

I001874

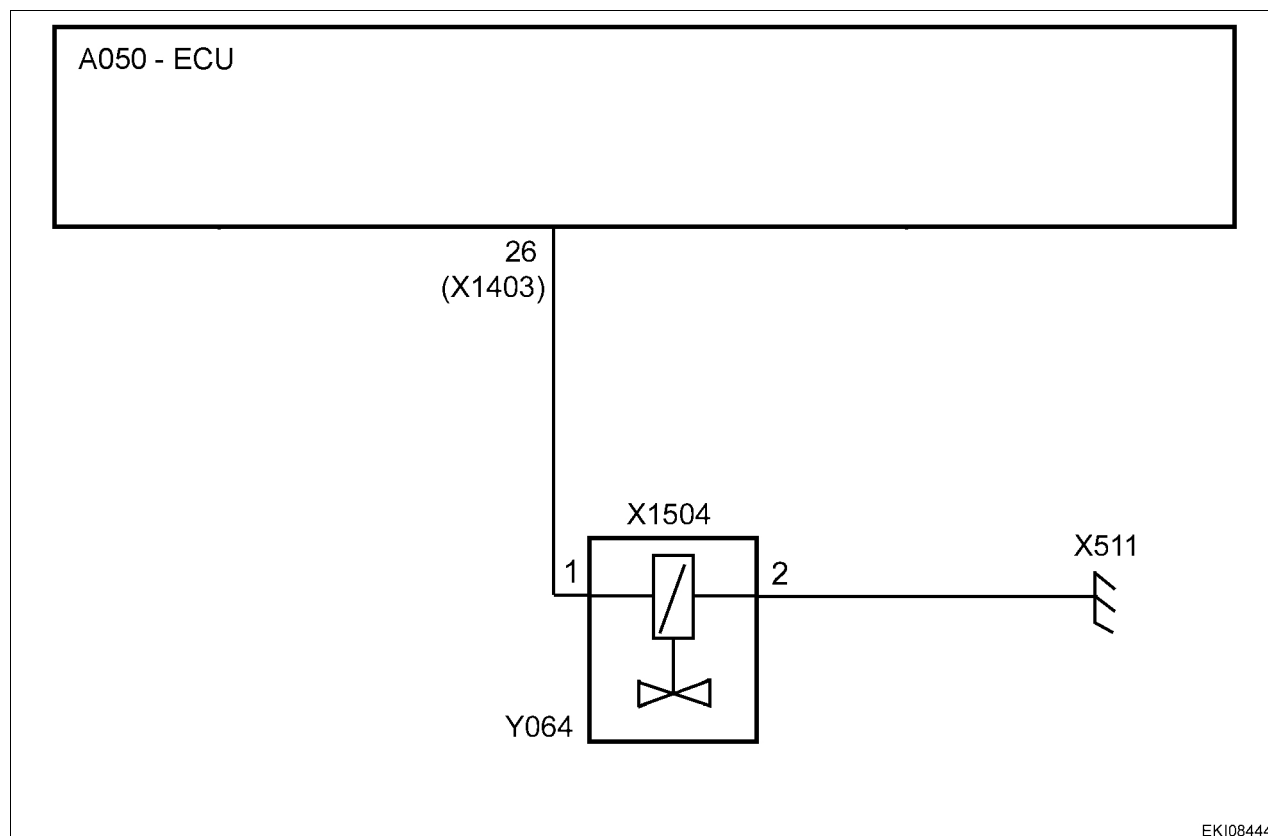
Test	Pin	Specified value	condition	Possible cause of fault
Actuation	1 (X1403)	0 ADC	Pull tractor away from stationary, speed below 25 Km/h	
		2.9 ADC	Speed above 25 Km/h	
		0 ADC	speed below 15 Km/h	

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



EKI08444

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

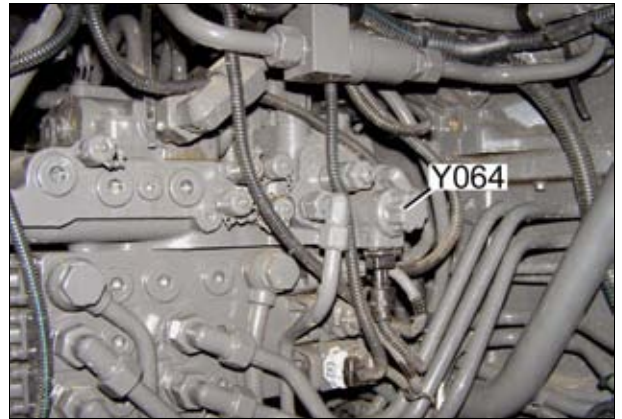


Fig. 560.

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.

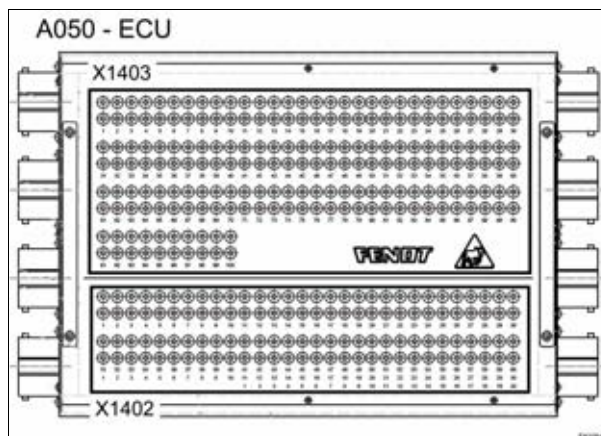


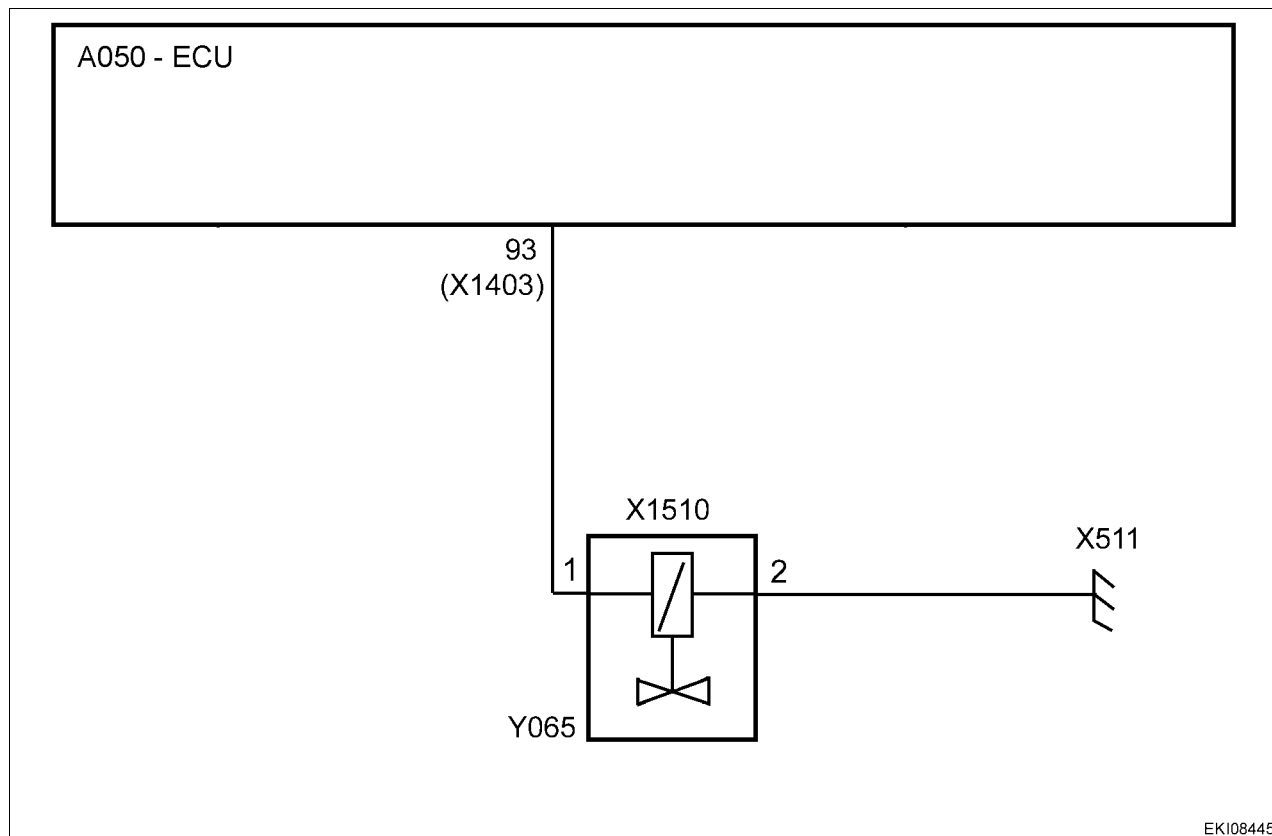
Fig. 561.

1001874

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

EKI08445

I002079

Fig. 562.

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.

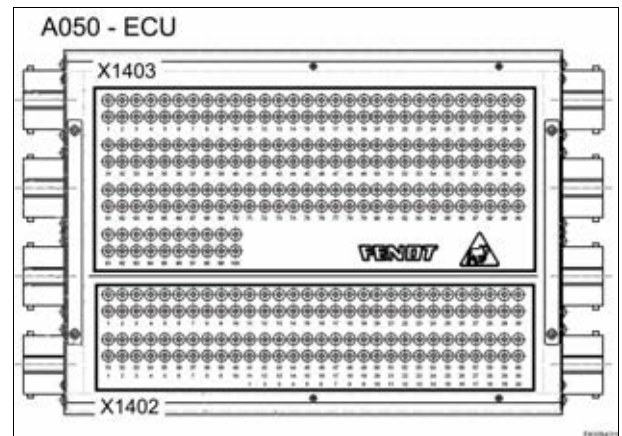


Fig. 564.

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

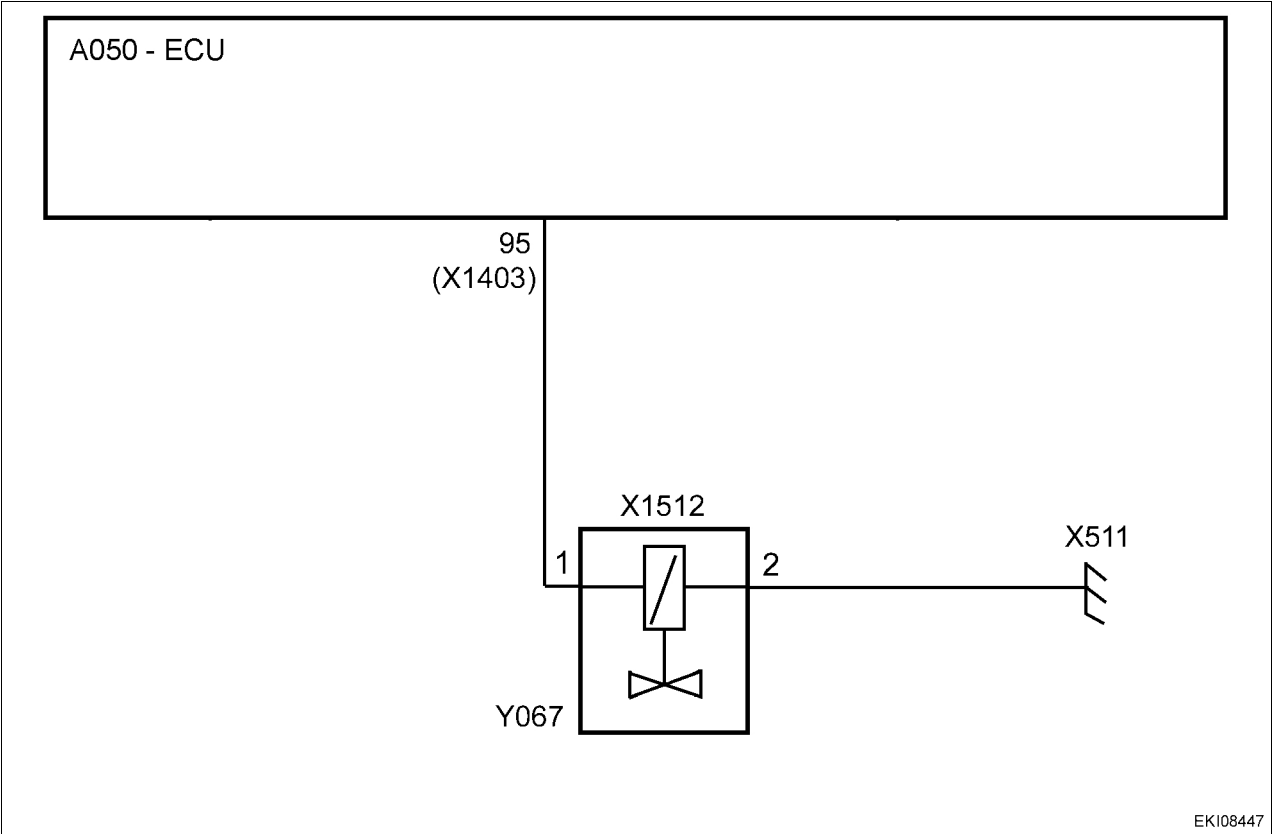


Fig. 565.

EK108447
1002081

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.

1001177

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.

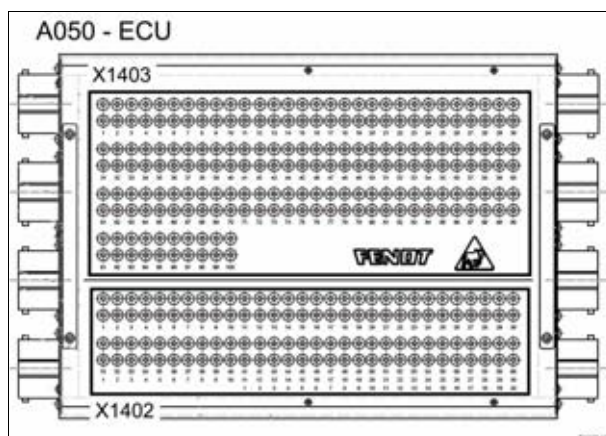


Fig. 567.

1001874

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-

T000660
Version 2
04-09-2009

527

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).

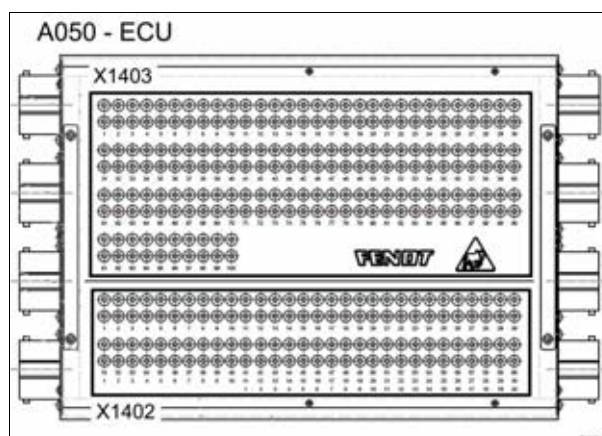


Fig. 568.

1001874

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)

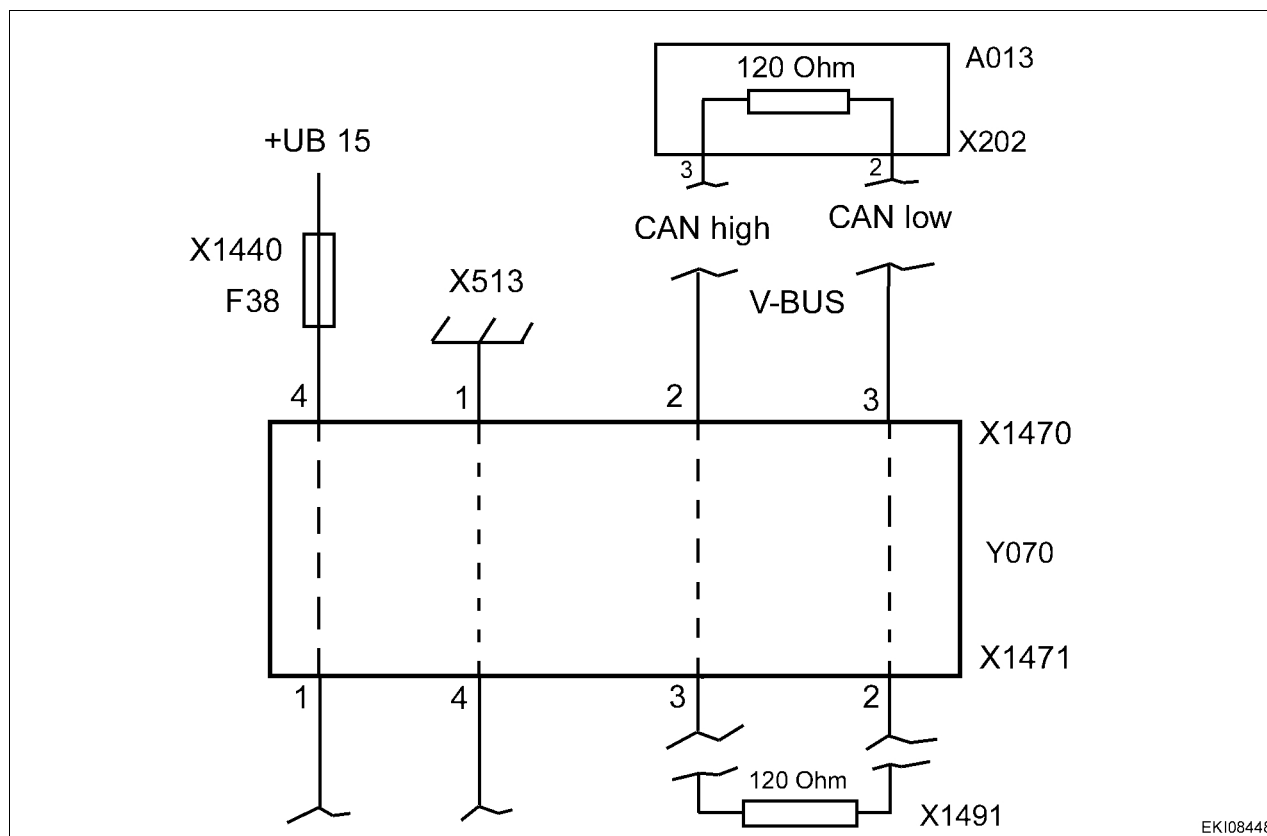


Fig. 569.

EK108448

1002089

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"

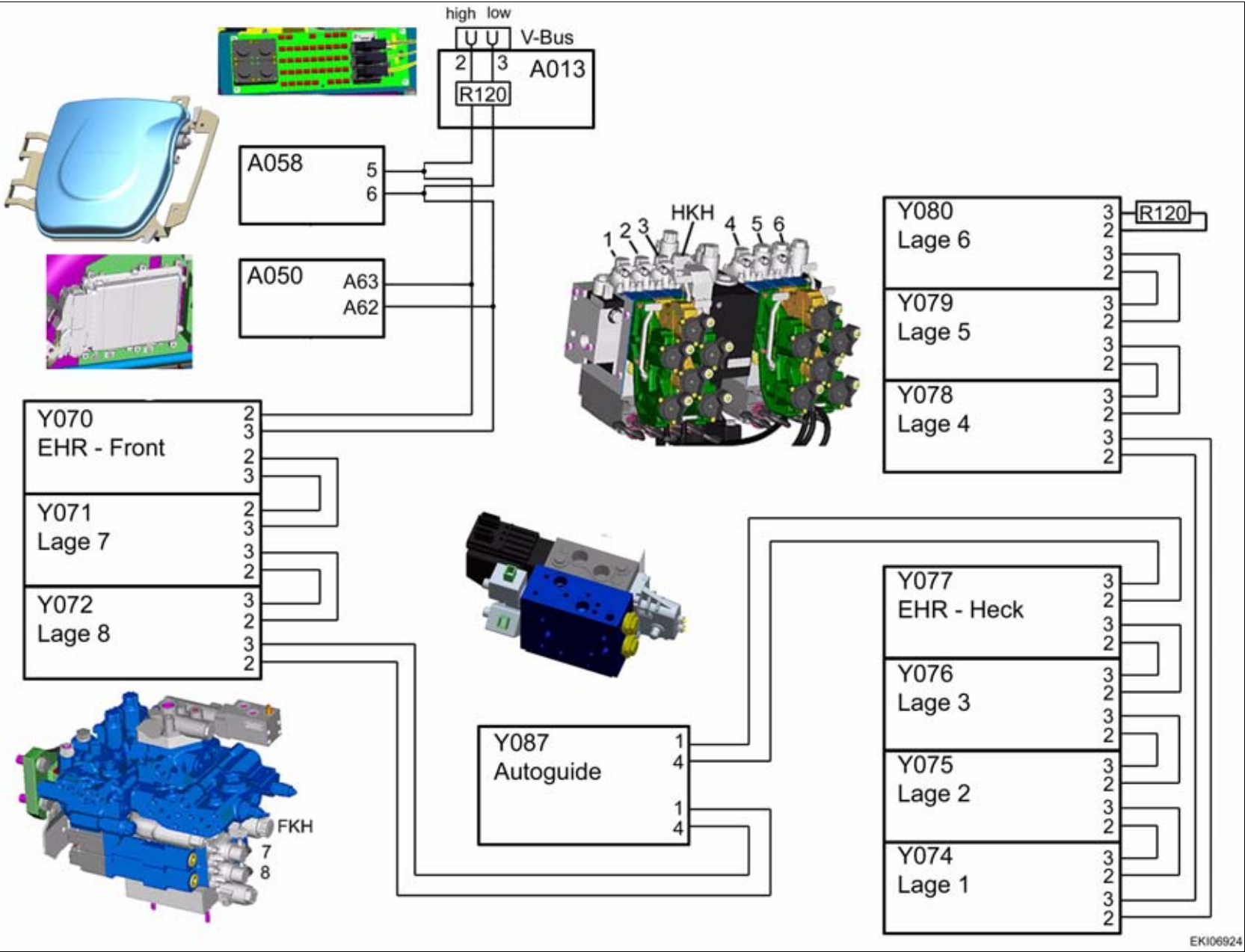


Fig. 570.

1004837

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-

T000661
Version 2
04-09-2009

531

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

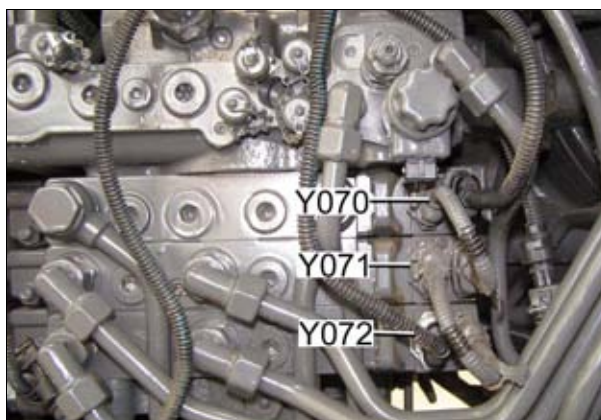


Fig. 571.

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.

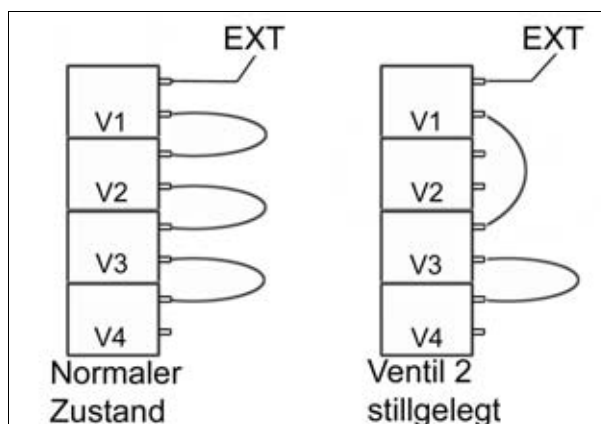
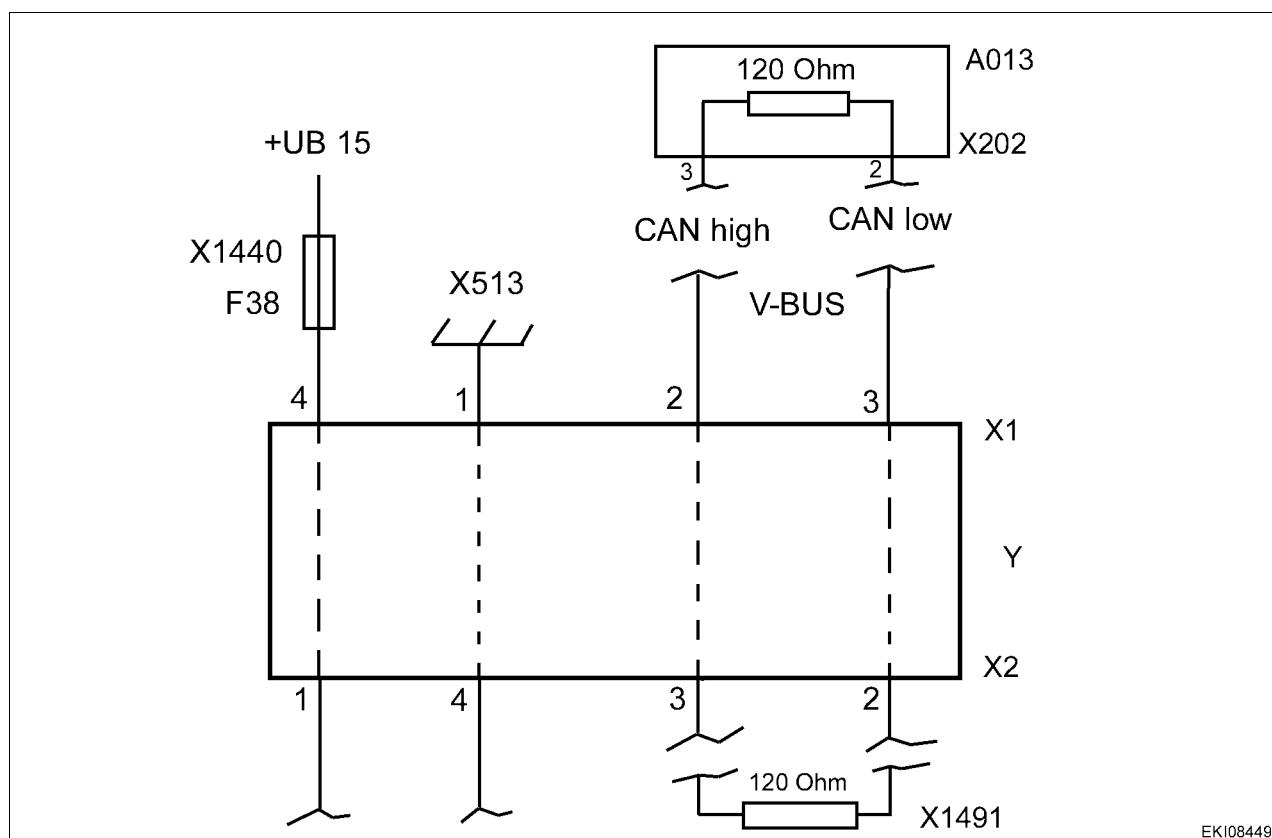


Fig. 572.

I001318

147 Y071/Y072 auxiliary control valve, middle

Circuit diagram: Electr. Auxiliary control valve (Y)



EKI08449

I002094

Fig. 573.

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"

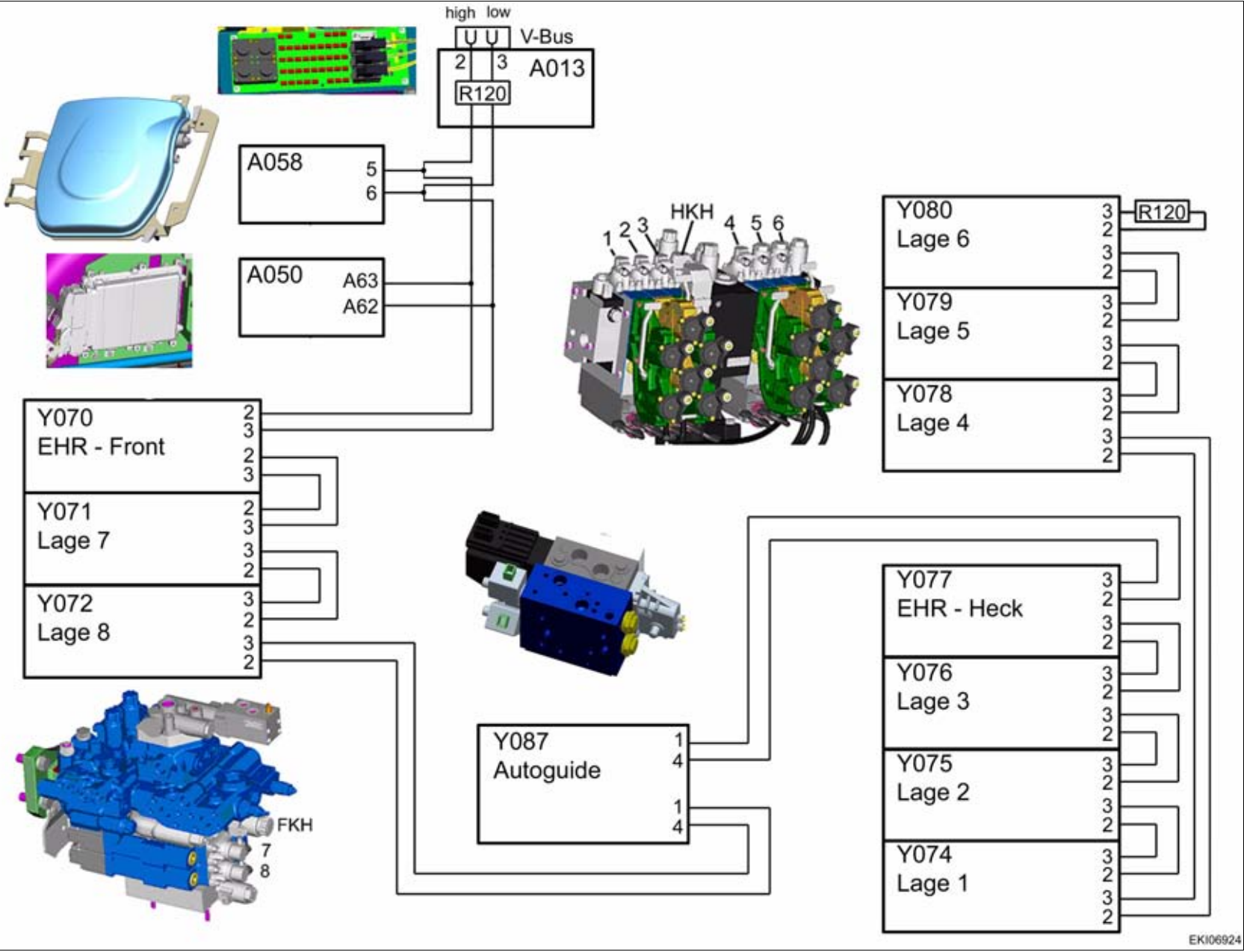


Fig. 574.

1004837

534

T000663

Version 2

04-09-2009

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-

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

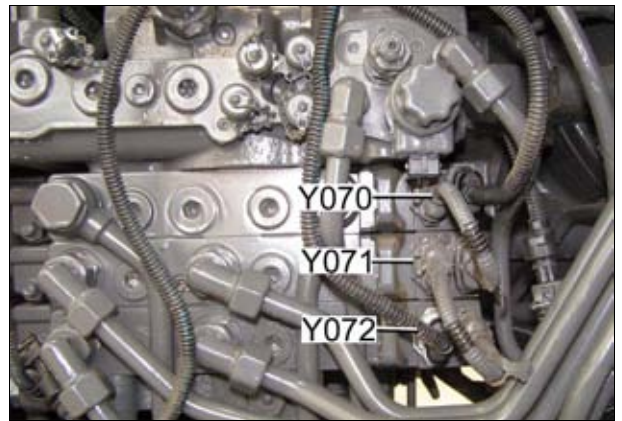


Fig. 575.

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.

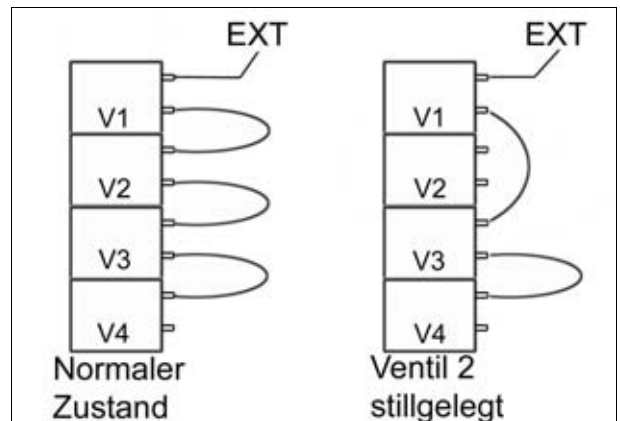


Fig. 576.

I001318

148 Y074/Y075/Y076/Y078/Y079/Y080 rear auxiliary control valve

Circuit diagram: Electr. Auxiliary control valve (Y)

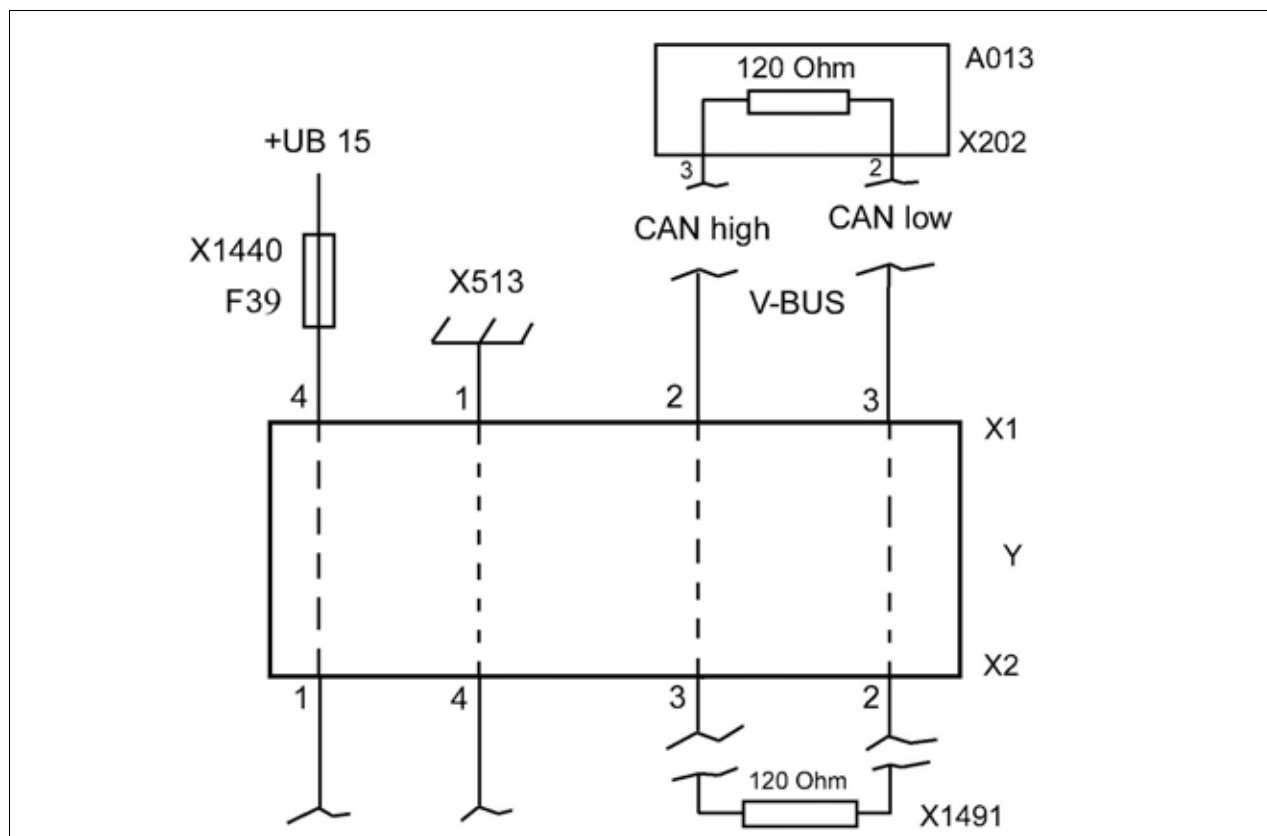


Fig. 577.

1007756

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"

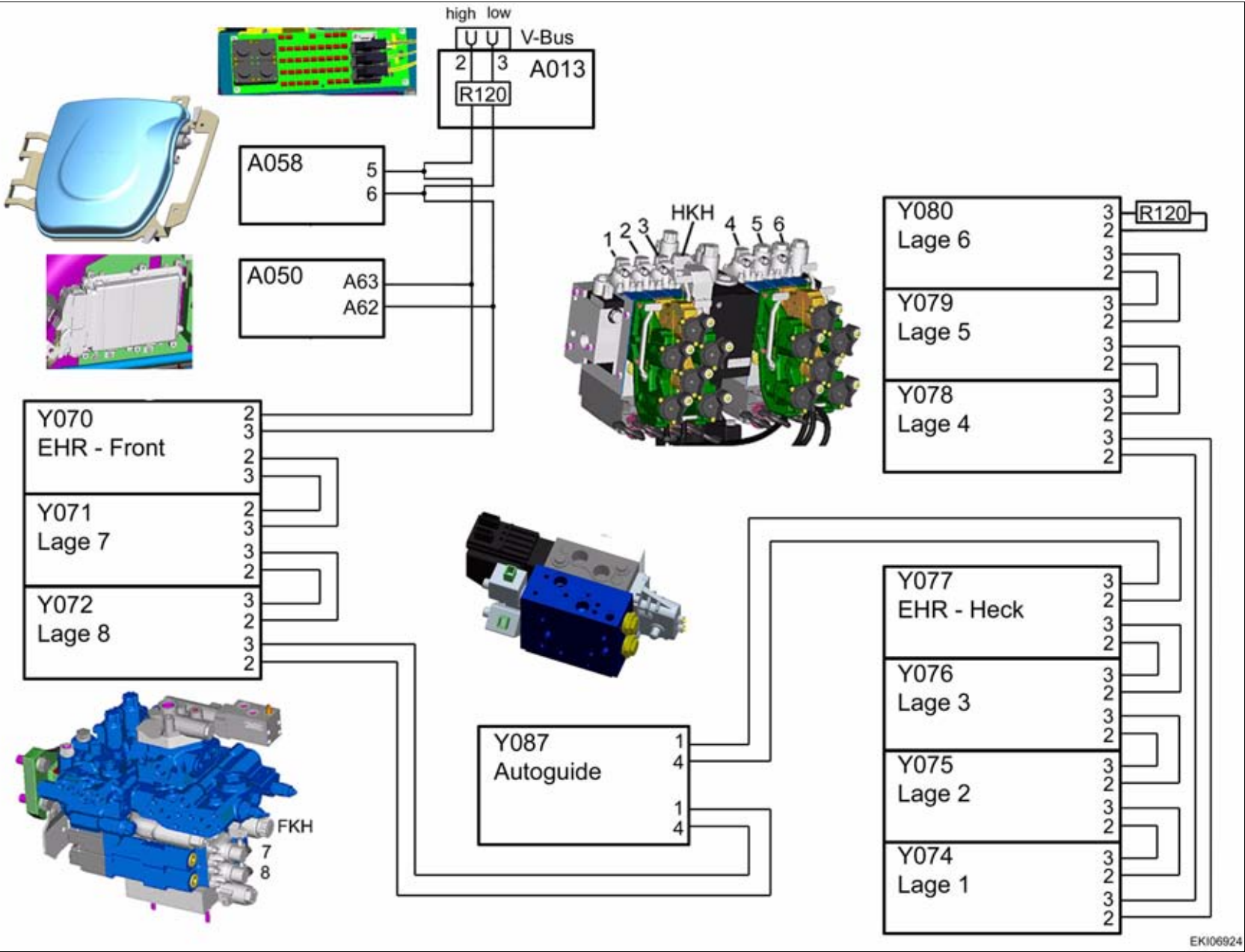


Fig. 578.

1004837

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-

T002875
Version 1
04-09-2009

537

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

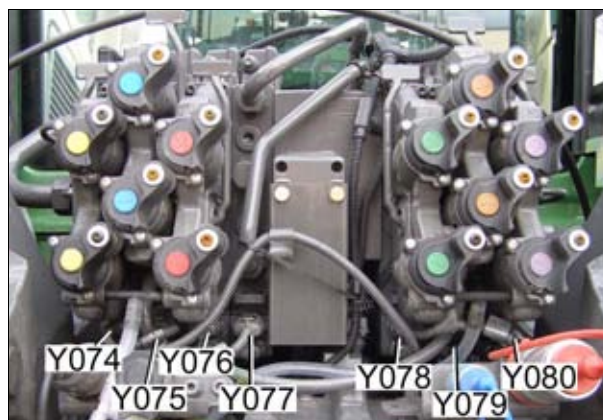


Fig. 579.

1001180

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.

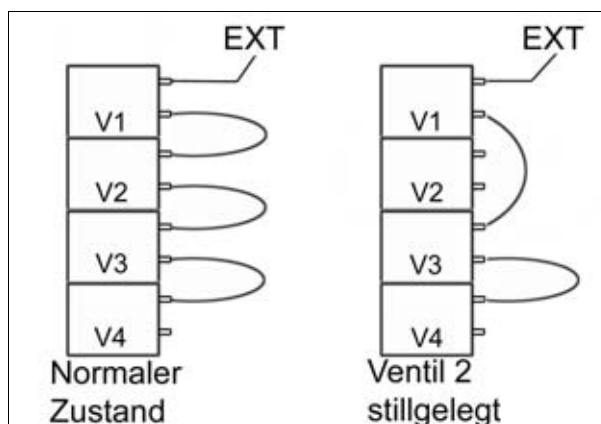


Fig. 580.

1001318

149 Y077 EPC cut-off valve (rear power lift)

Circuit diagram: Y077 EHR cut-off valve (rear power lift)

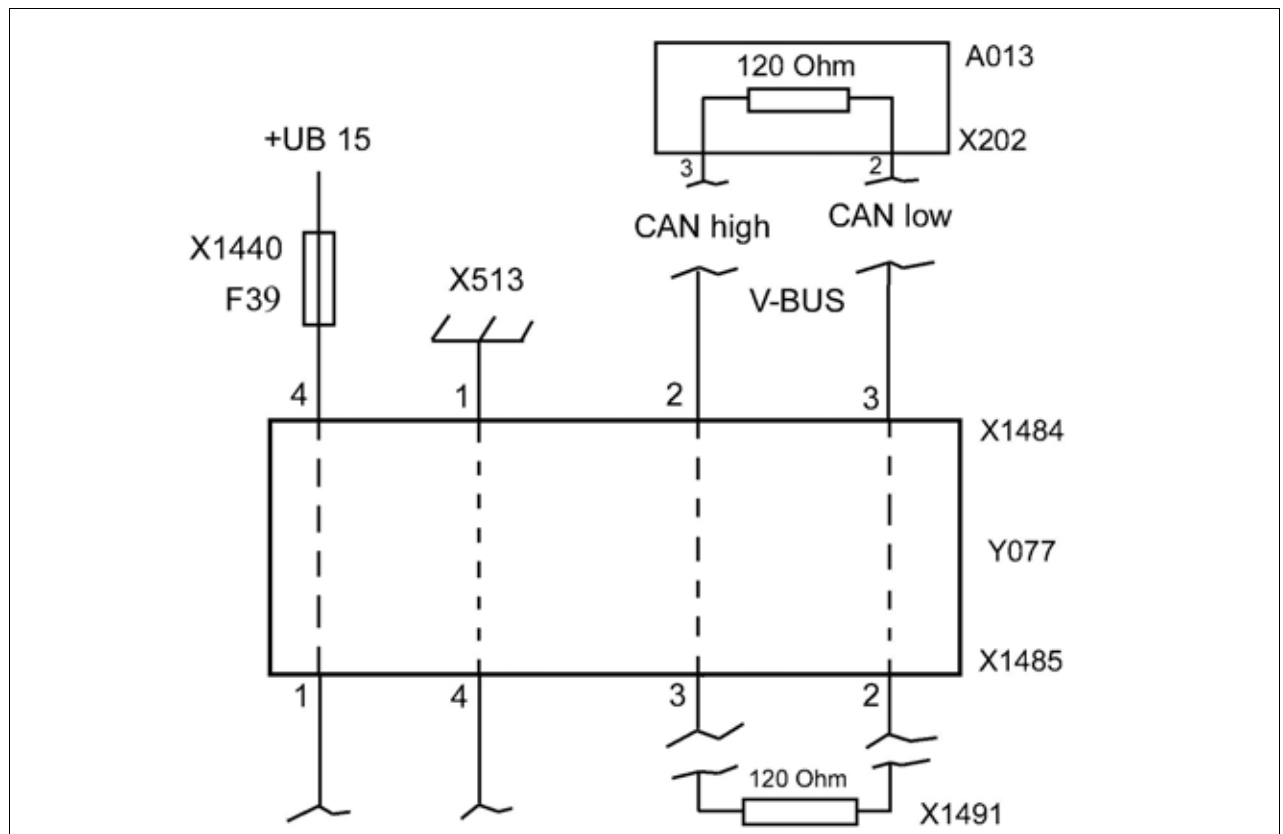


Fig. 581.

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"

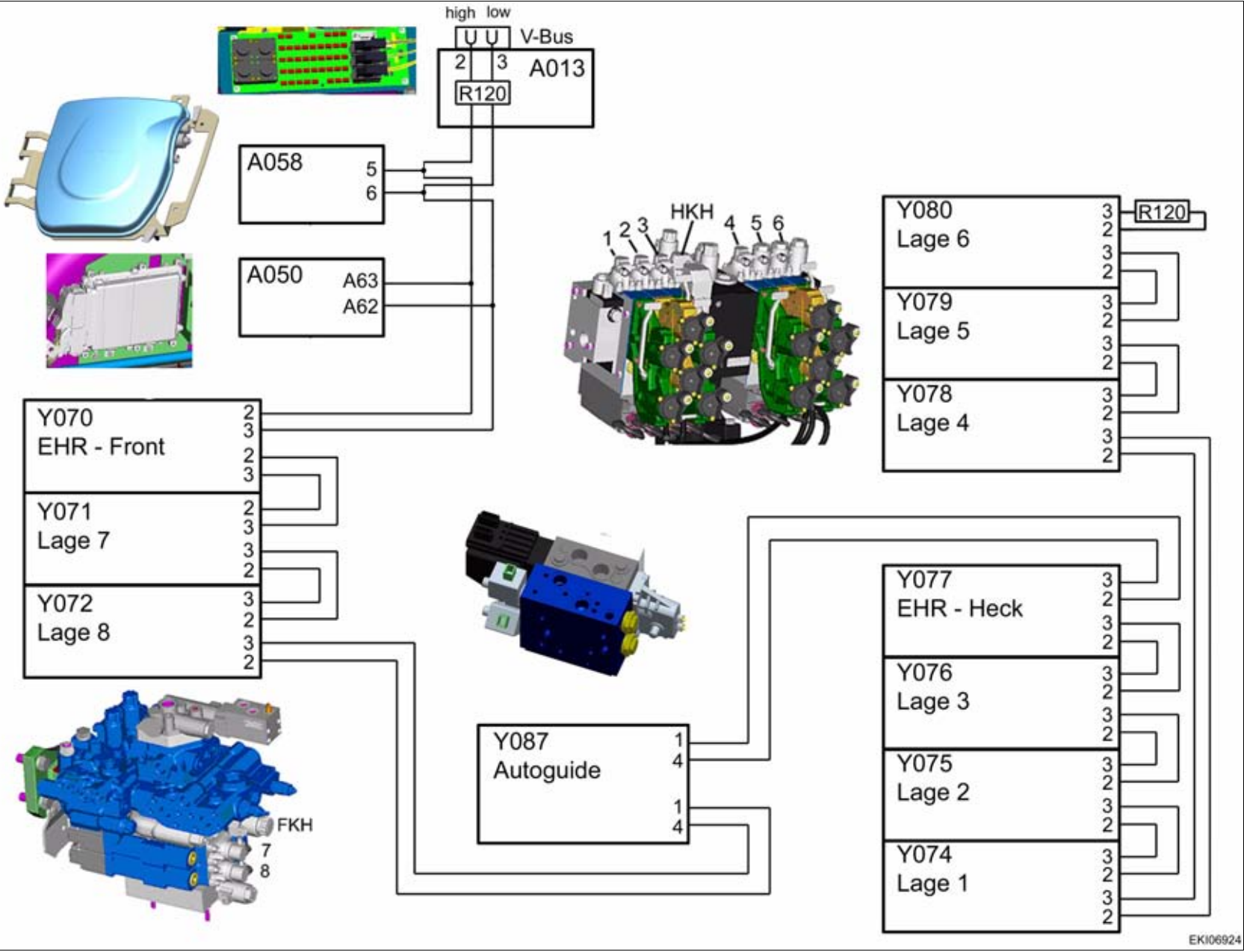


Fig. 582.

1004837

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

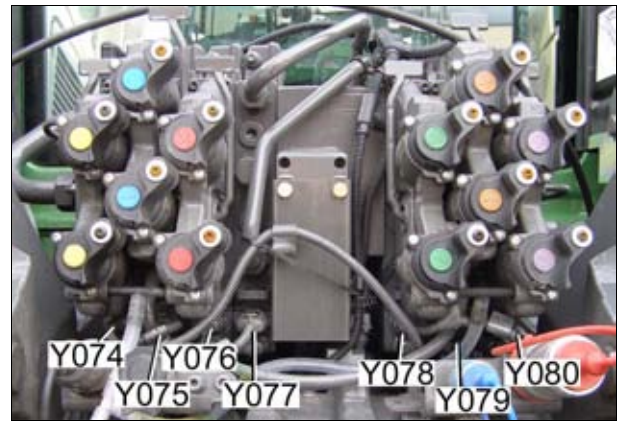


Fig. 583.

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.

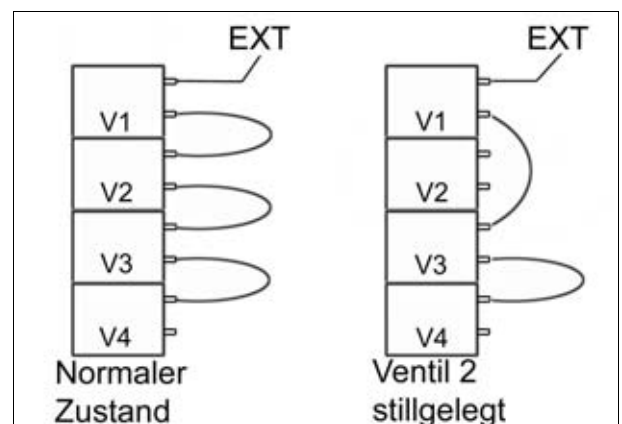


Fig. 584.

I001318

150 Y082/Y083-Solenoid valve, lower link stabiliser, lock/release

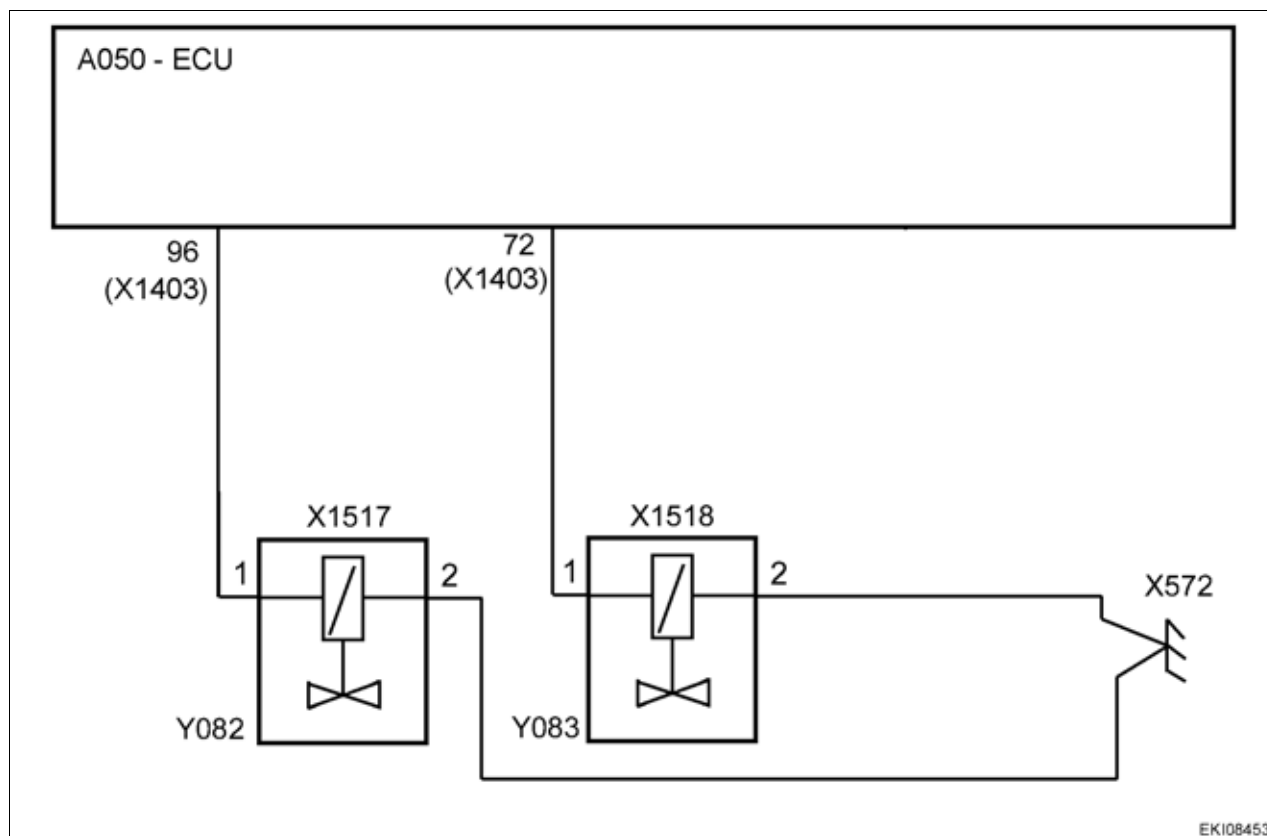


Fig. 585.

EKI08453
 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

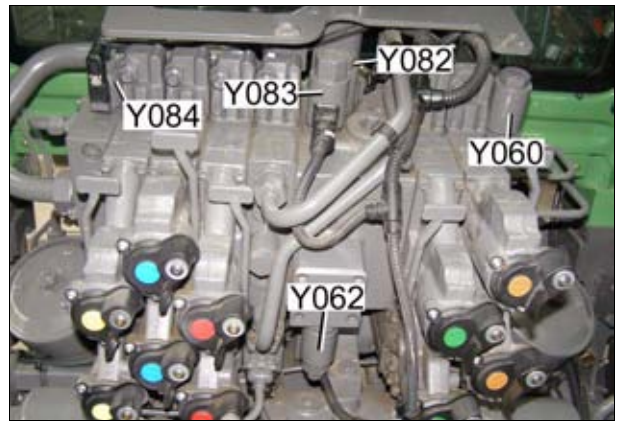


Fig. 586.

1001169

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.

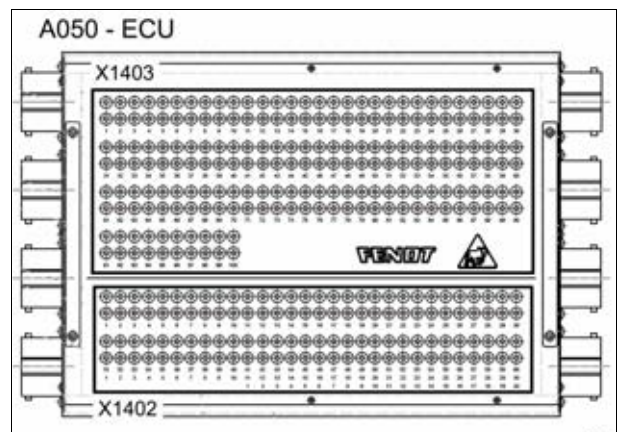


Fig. 587.

1001874

Y082 - Solenoid valve, lower link stabiliser, lock

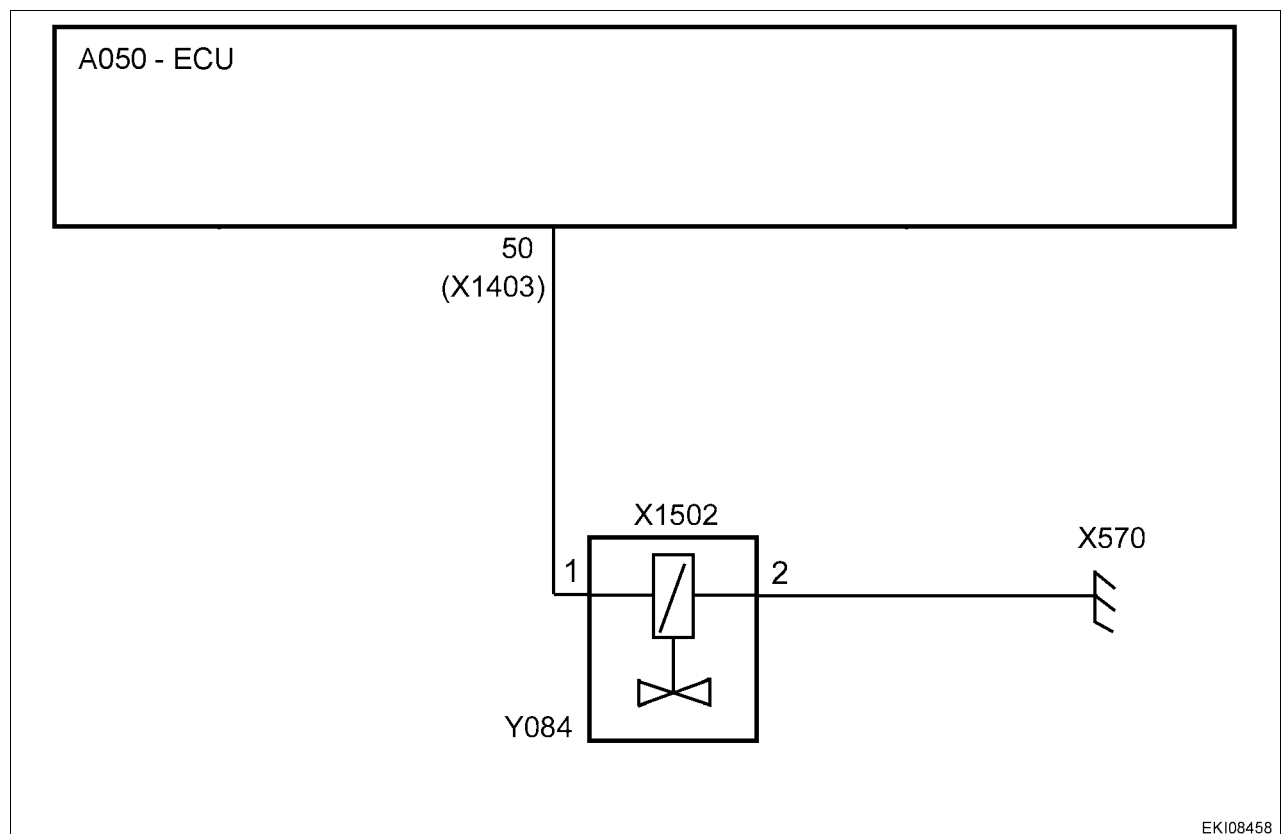
Test	Pin	Specified value	condition	Possible cause of fault
Actuation	96	1.7 ADC	Lower link stabiliser locked	
			Note: The Y082 solenoid valve is energised for approx. 5 seconds when it is locked.	
		0 ADC	Lower link stabiliser unlocked	

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

EKI08458

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

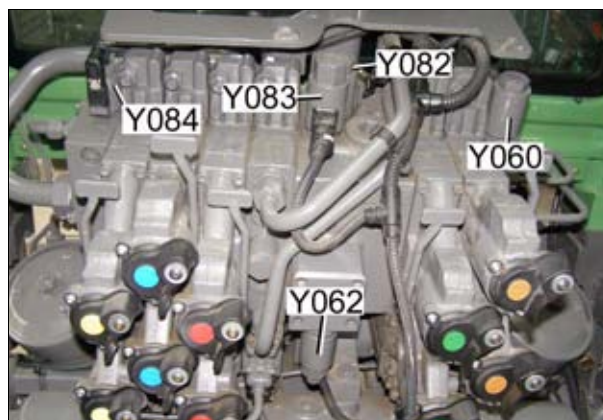


Fig. 589.

1001169

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.

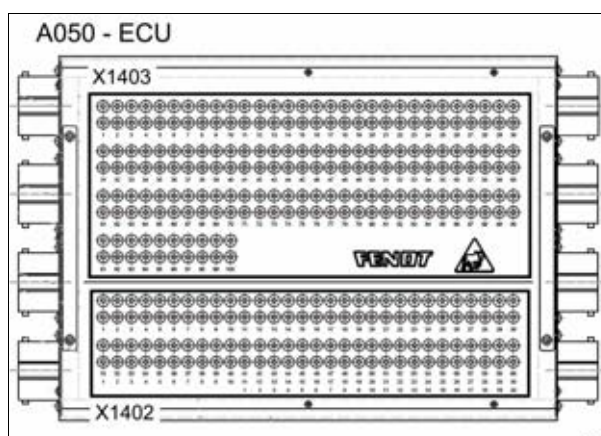


Fig. 590.

1001874

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

546

T000667
Version 2
04-09-2009

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-

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)

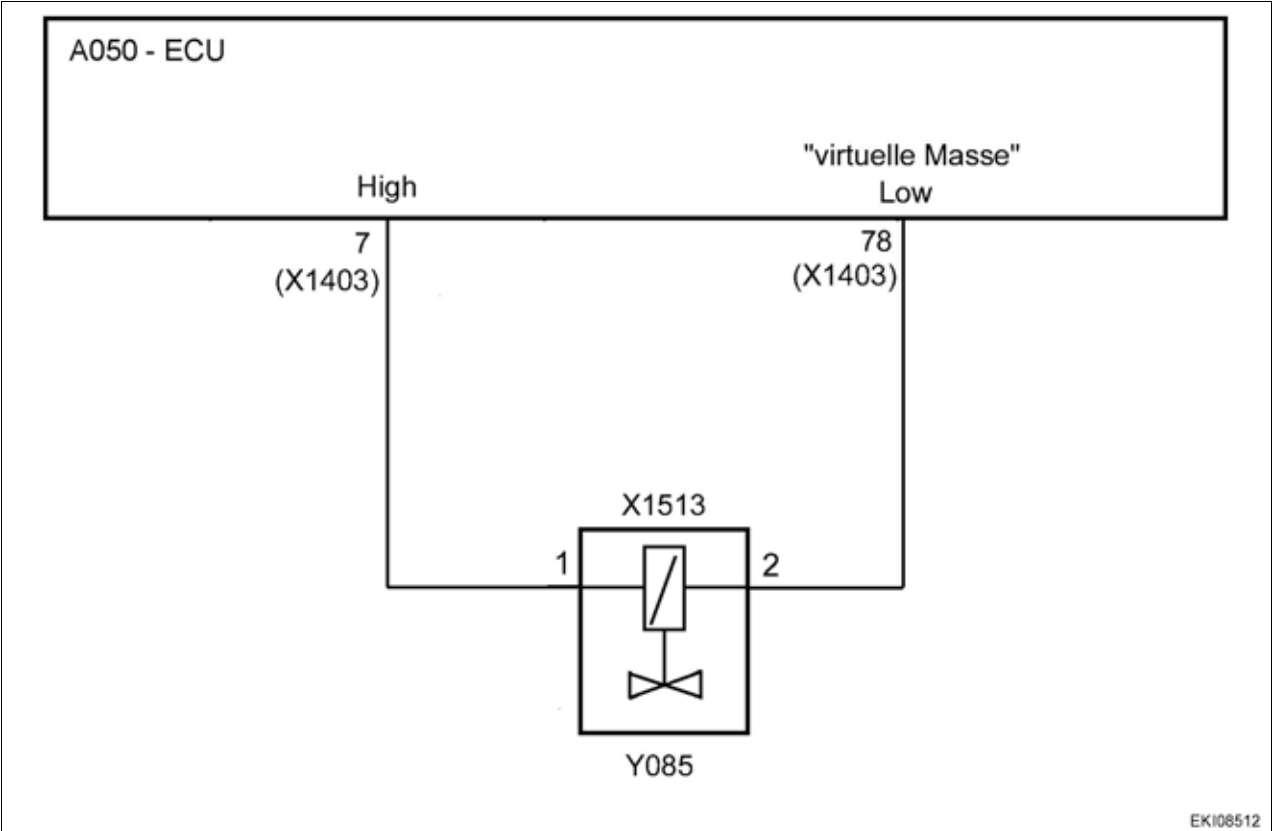


Fig. 591.

1002164

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.

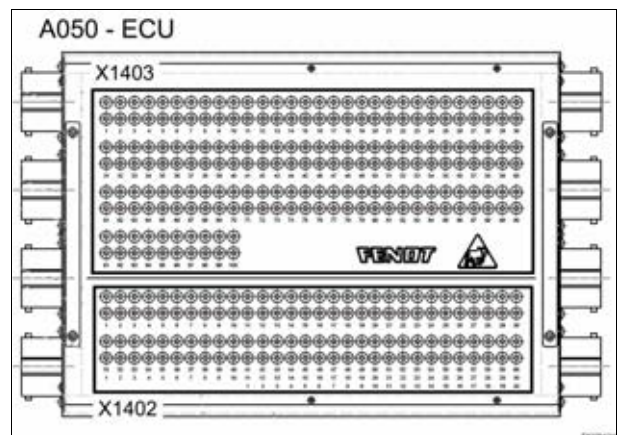


Fig. 593.

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

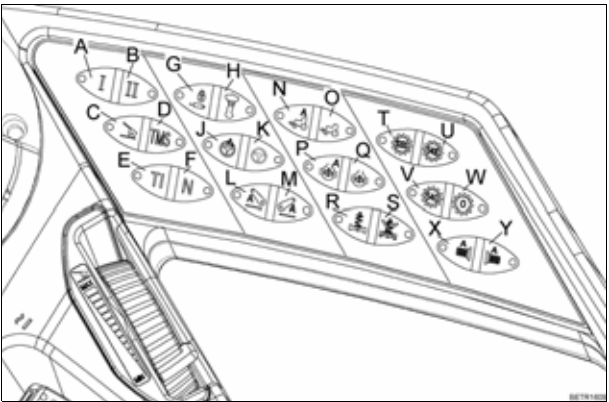


Fig. 594. I001157

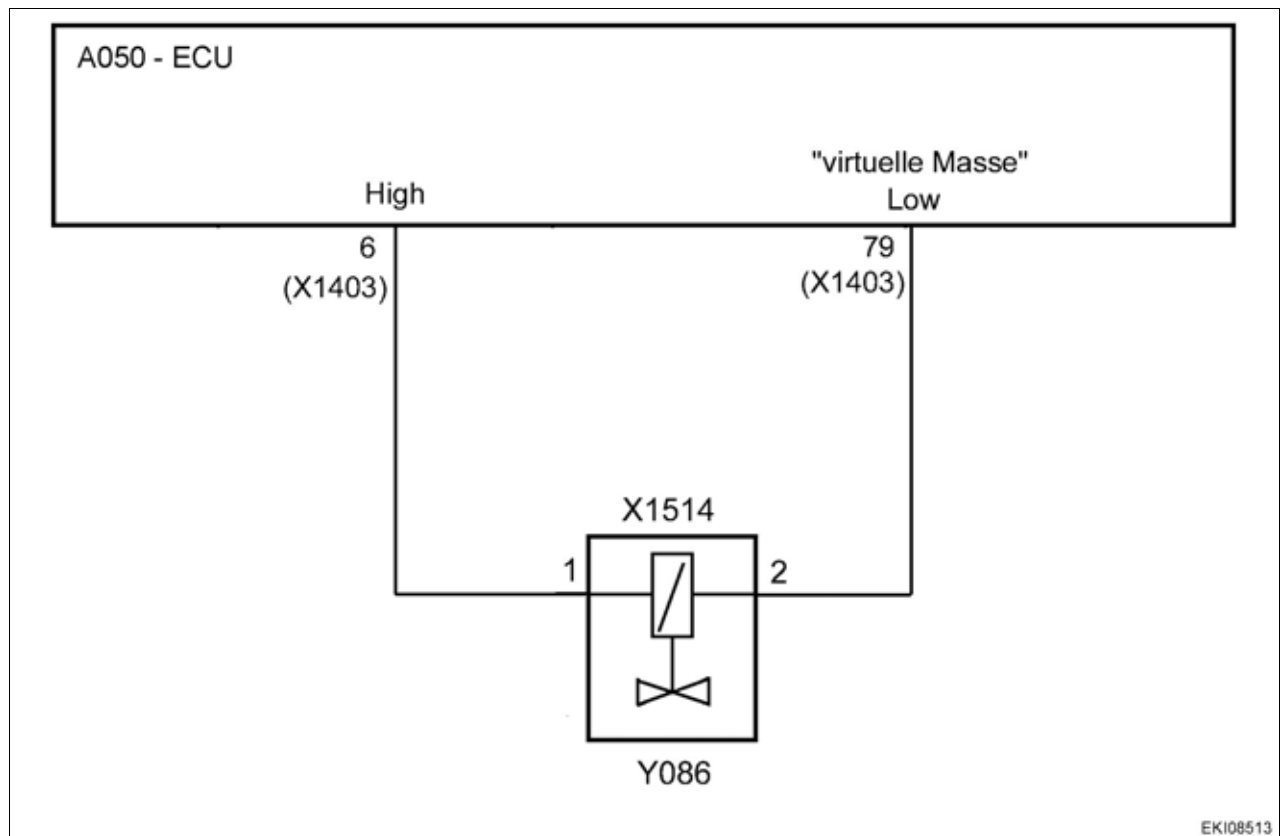
153 Y086 solenoid valve, steering disconnect (Auto-Guide)

Fig. 595.

EKI08513

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.

1001987

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.

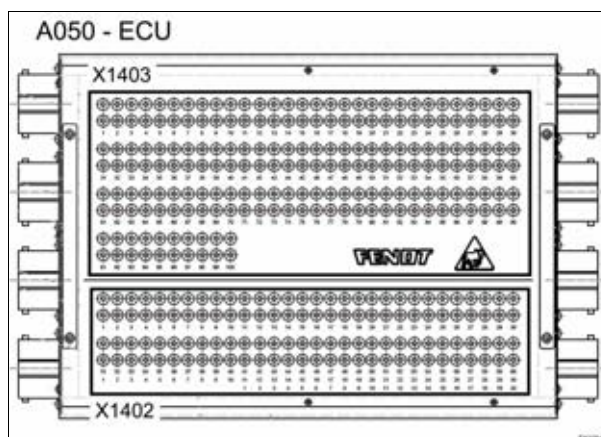


Fig. 597.

1001874

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**

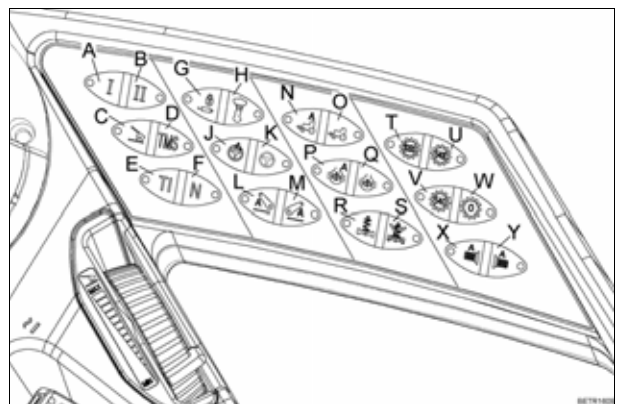


Fig. 598.

1001157

154 Y087 steering valve block, Auto-Guide

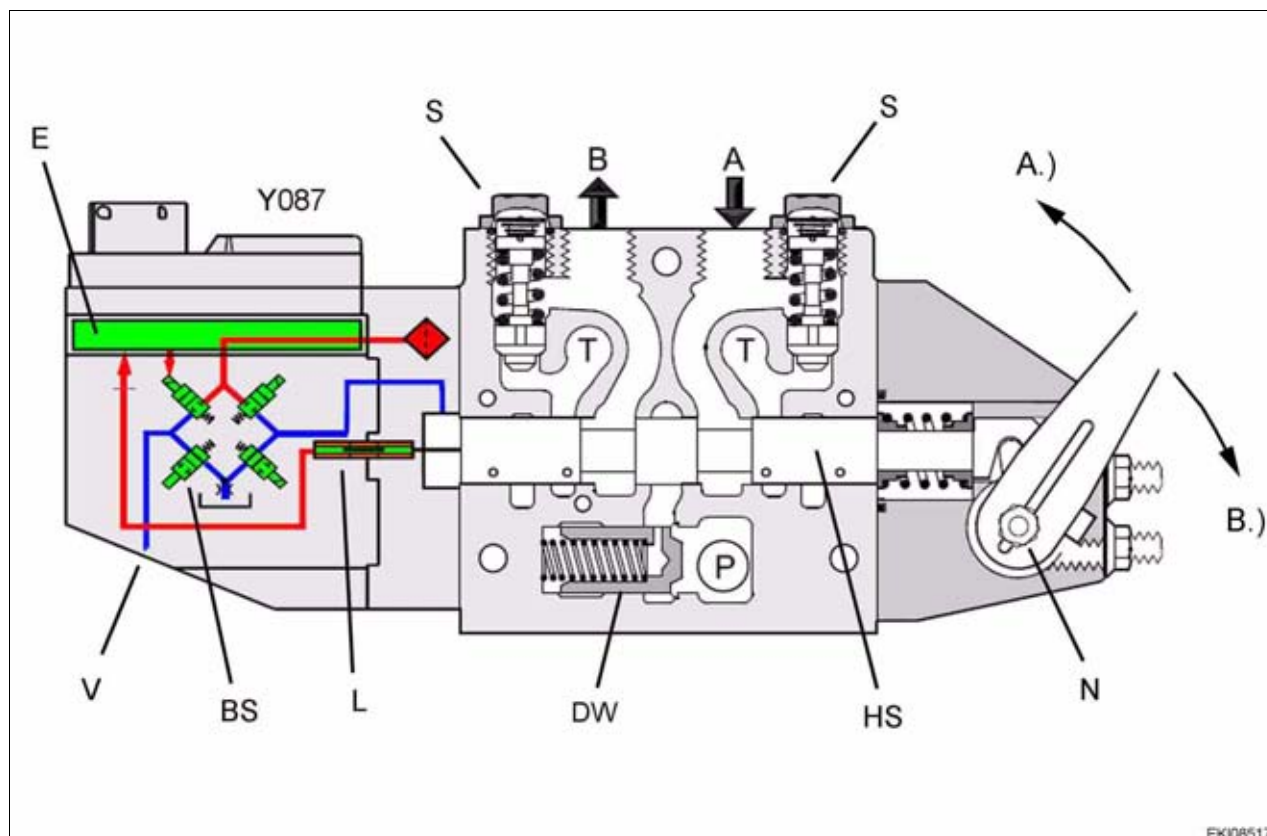


Fig. 599.

EK08517
 1002336

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)

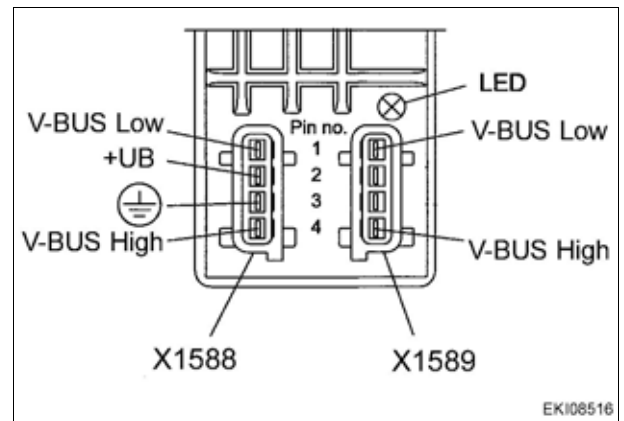


Fig. 600.

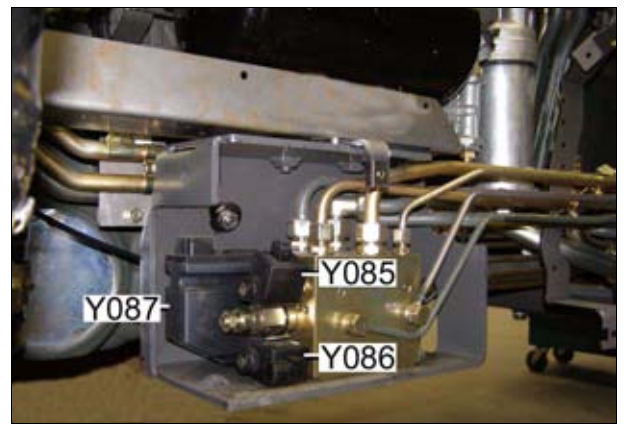
EKI08516
I002198**NOTE:** [see §20](#)[see §34](#)[see §1](#)**NOTE:** The **Y087** - Steering valve block, Auto-Guide is calibrated[see §8](#)

Fig. 601.

I001987

155 Y091 dispensing unit (fuel)

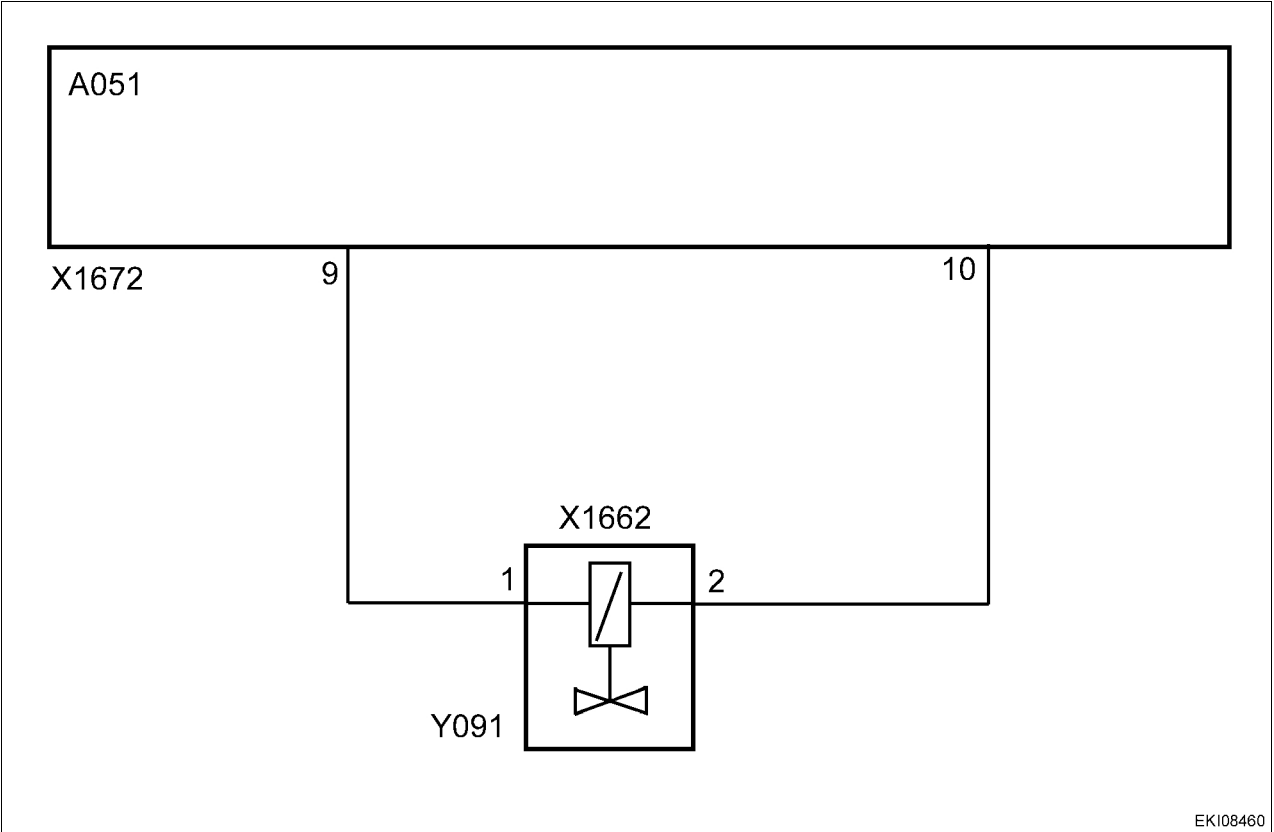


Fig. 602.

1002115

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)

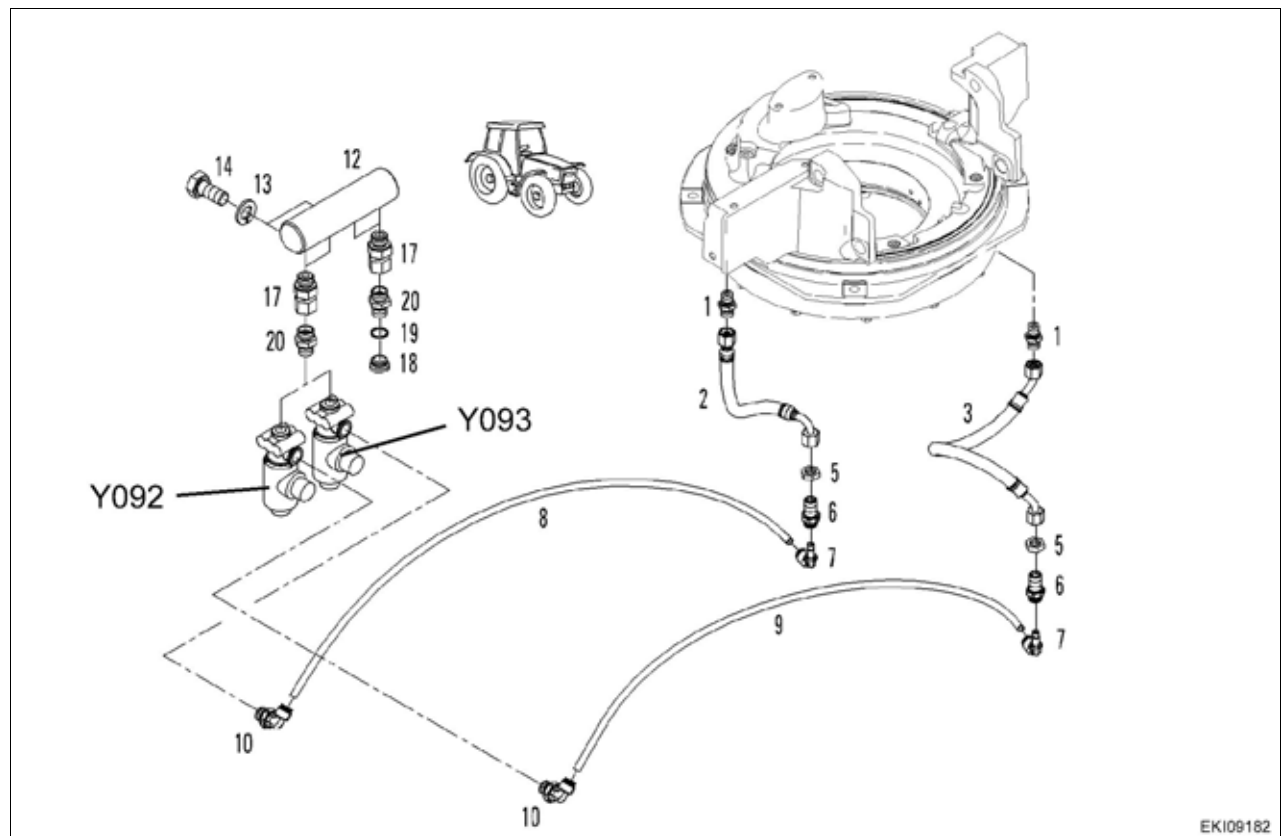


Fig. 604. Pneumatic support for the reverse drive control "Rüfa"

EKI09182

I004827

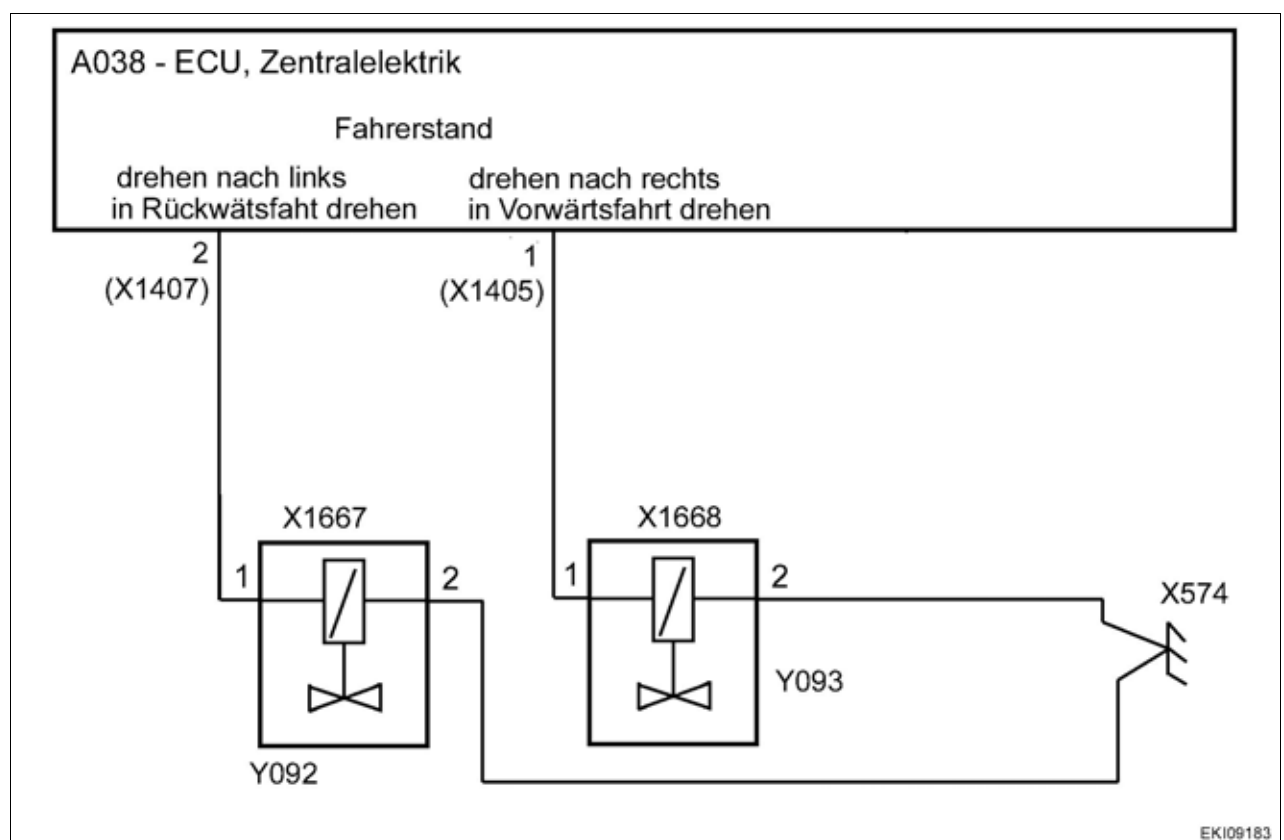


Fig. 605.

EKI09183

I004828

Measuring points and signal values

Y092/Y093 solenoid valve	
Pin	Function
1	Actuation
2	Earth

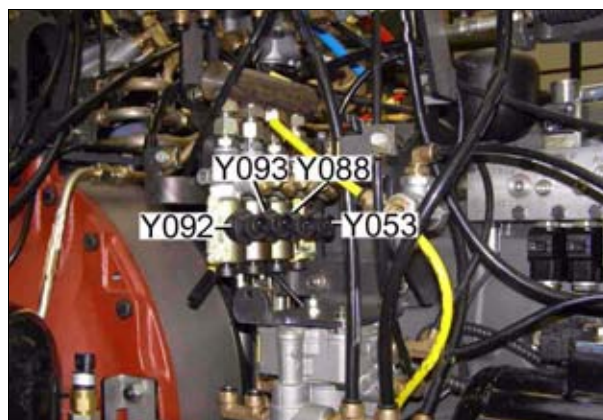


Fig. 606.

1001303

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 component
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 component
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

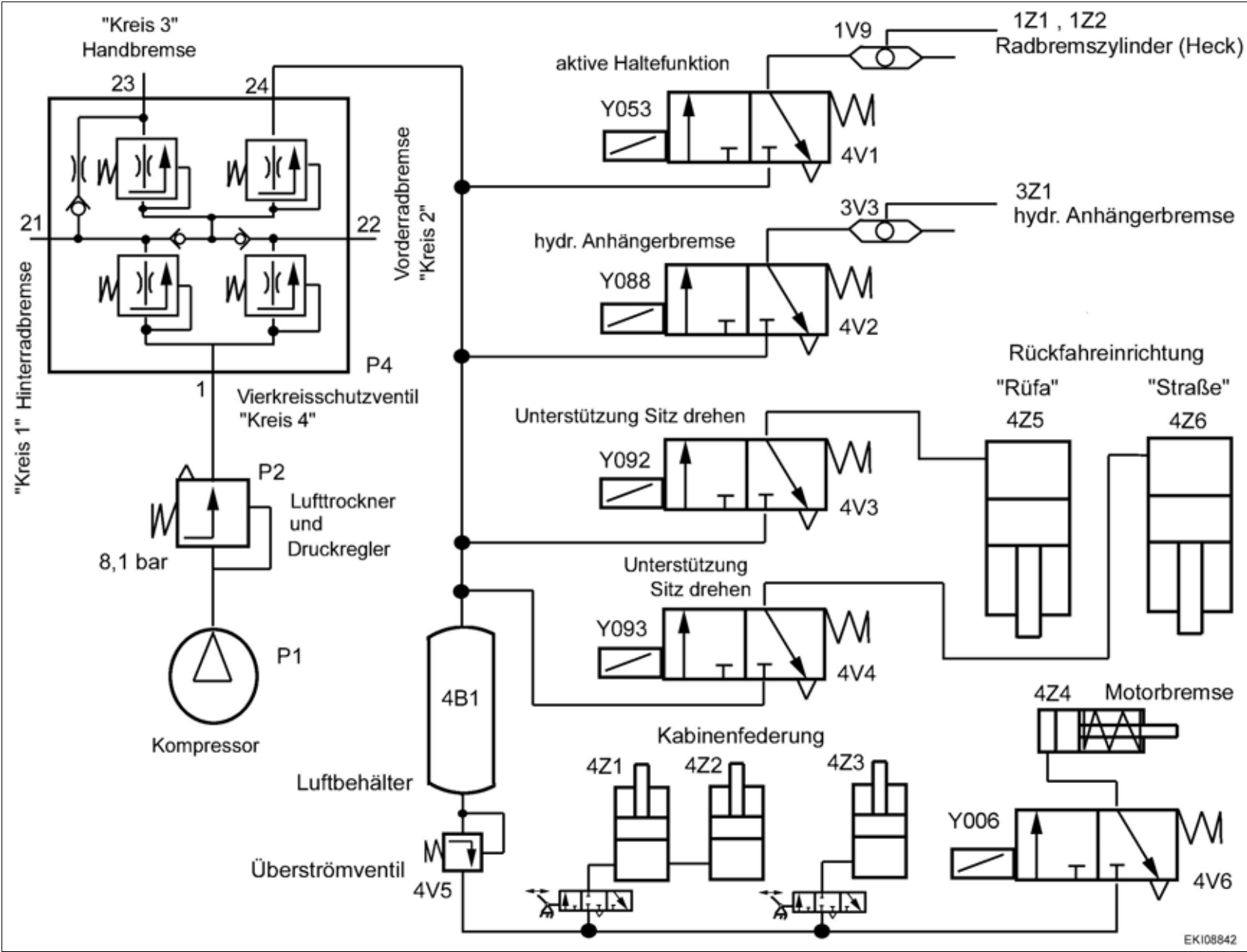


Fig. 608.

1003091

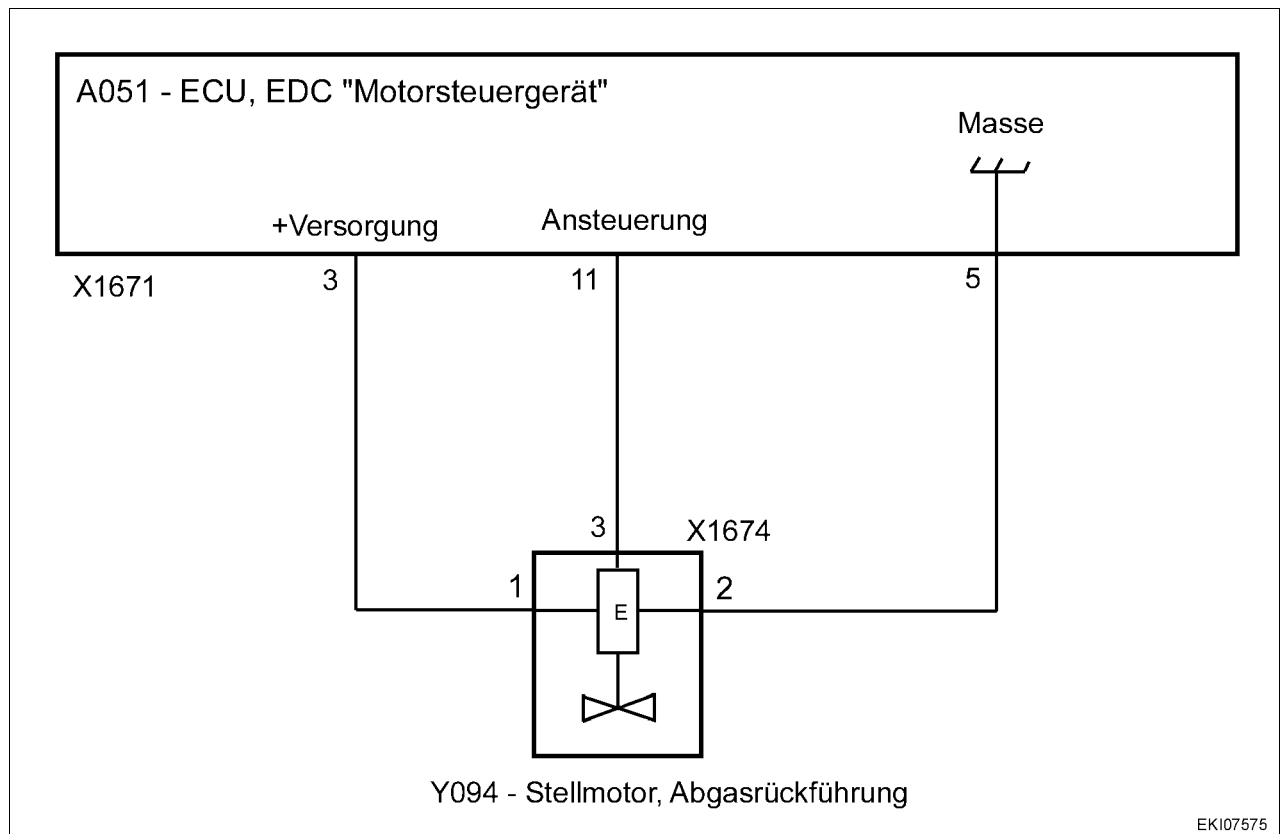
157 Y094 exhaust gas recirculation actuator motor

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

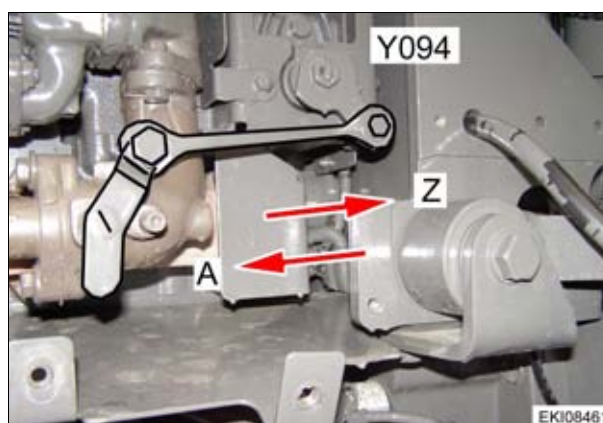


Fig. 610.

1001846

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 ignitionConnect 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 ignitionConnect 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 ignitionConnect 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!)

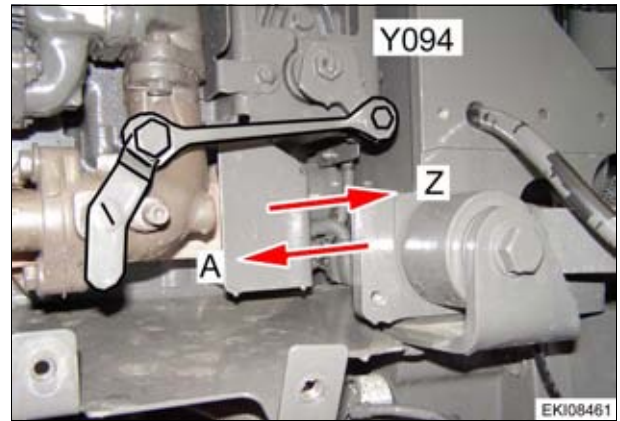


Fig. 611.

I001846

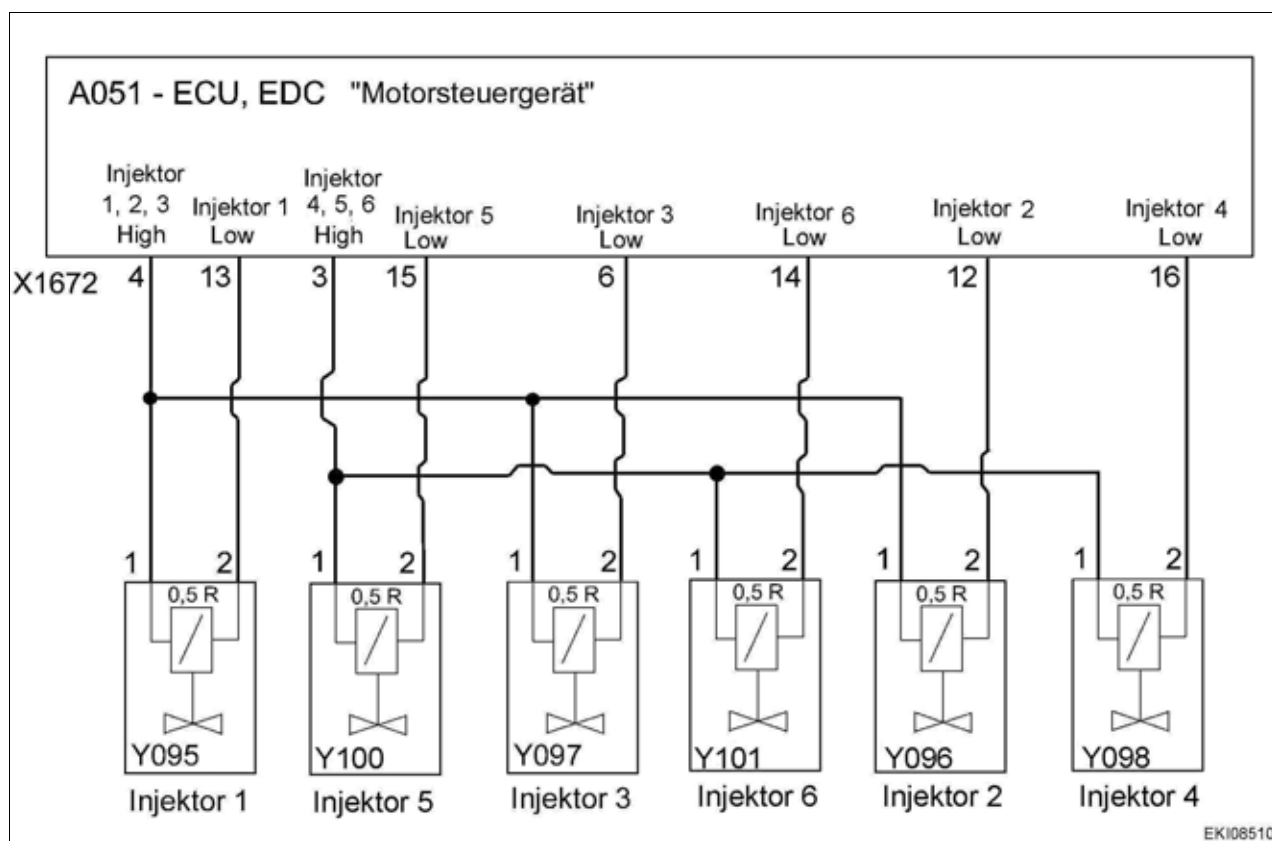
158 Y095 to Y098, Y100, Y101 - injectors 1 to 6

Fig. 612.

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)

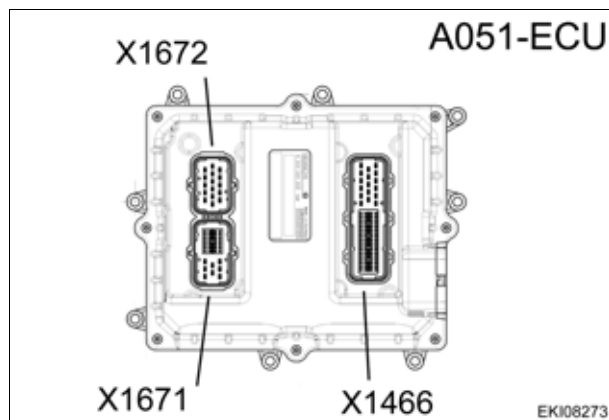


Fig. 613.

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

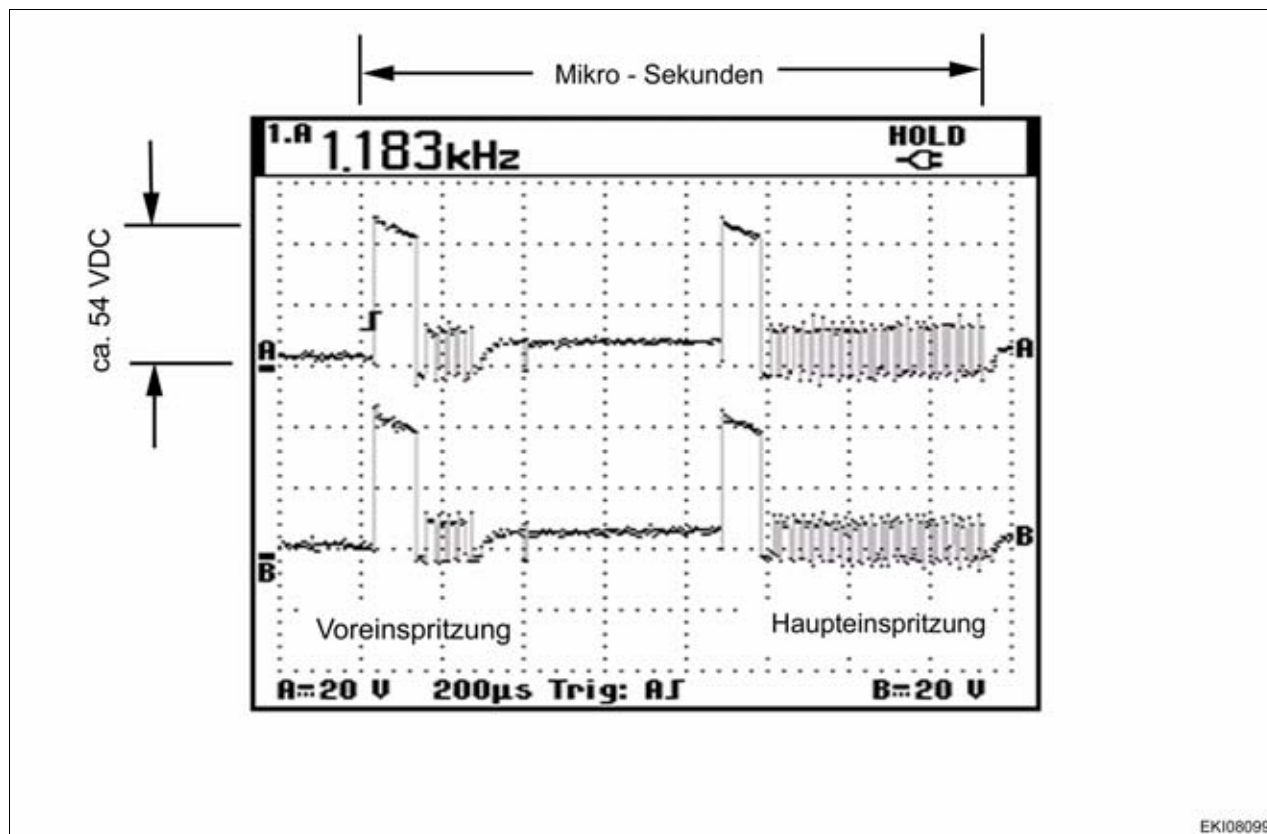


Fig. 614.

EKI08099

1002154

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	9015 Electrical system/starter lockout	9015 Electrical system/starter lockout
B	Faults		
C	Documents and Diagrams		
D	Component location		
E	Testing		
F	Setting and Calibration		
G	Repair		
H	Service – Info		

9015 Electrical system/starter lockout

F	Setting and calibrating	5

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.
– Need only be held up to the ignition one after the other	– New ORANGE vehicle keys can only be taught in once on a A077 - Immobiliser ECU.
– For each BLUE vehicle key, you must wait 10 seconds	– Must be put in the ignition one after the other  The ignition key must not be turned.
	– For each ORANGE vehicle key, you must wait 15 seconds

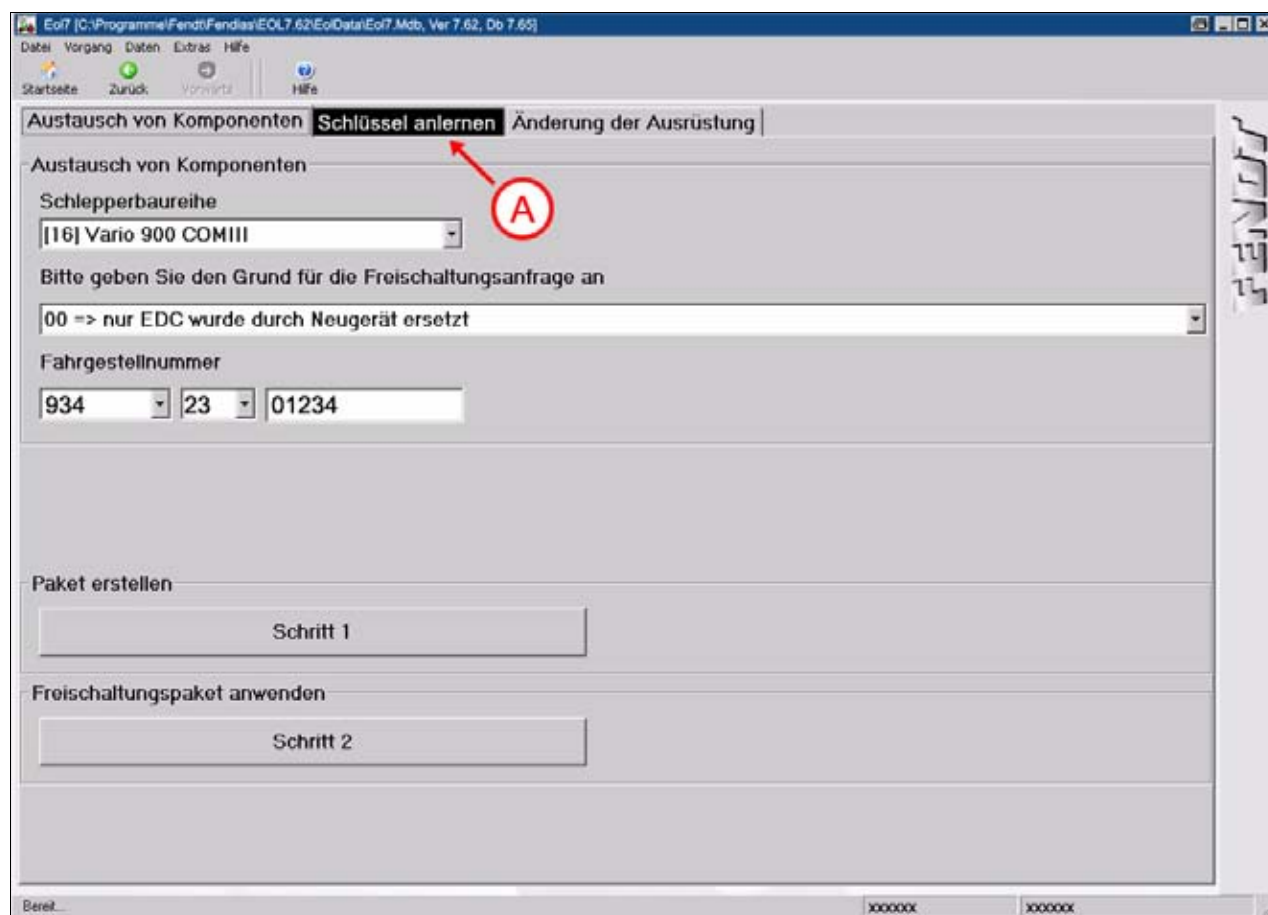


Fig. 1.

1009414

Click on the **KEY TEACH-IN** tab (A) to switch to the "Key teach-in" menu page

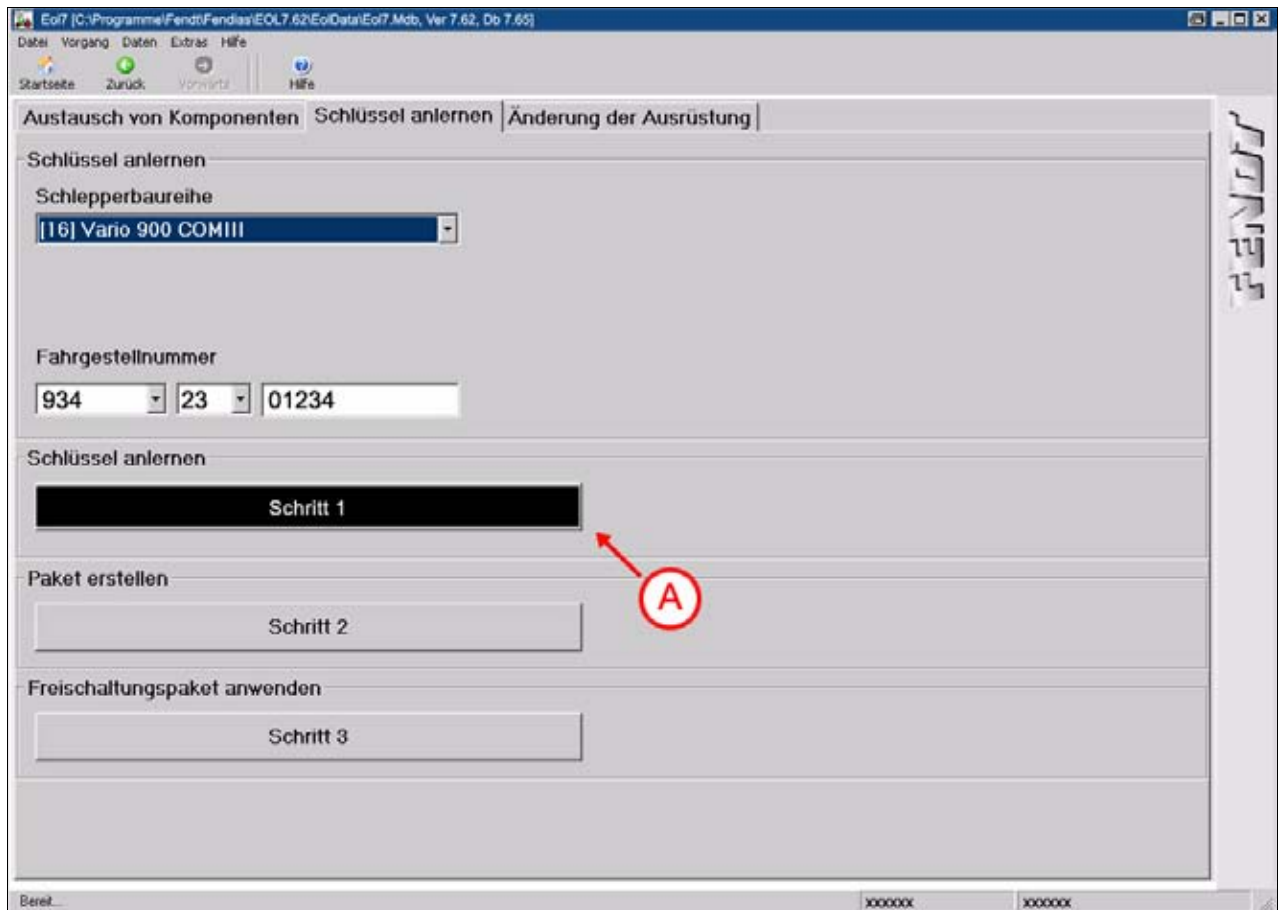


Fig. 2.

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)

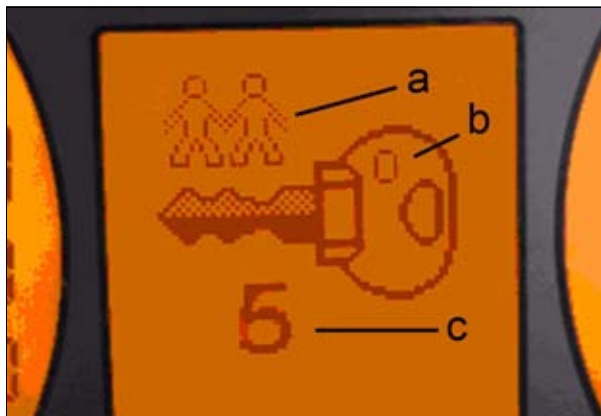


Fig. 4. Display in the VDO instrument panel:

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")

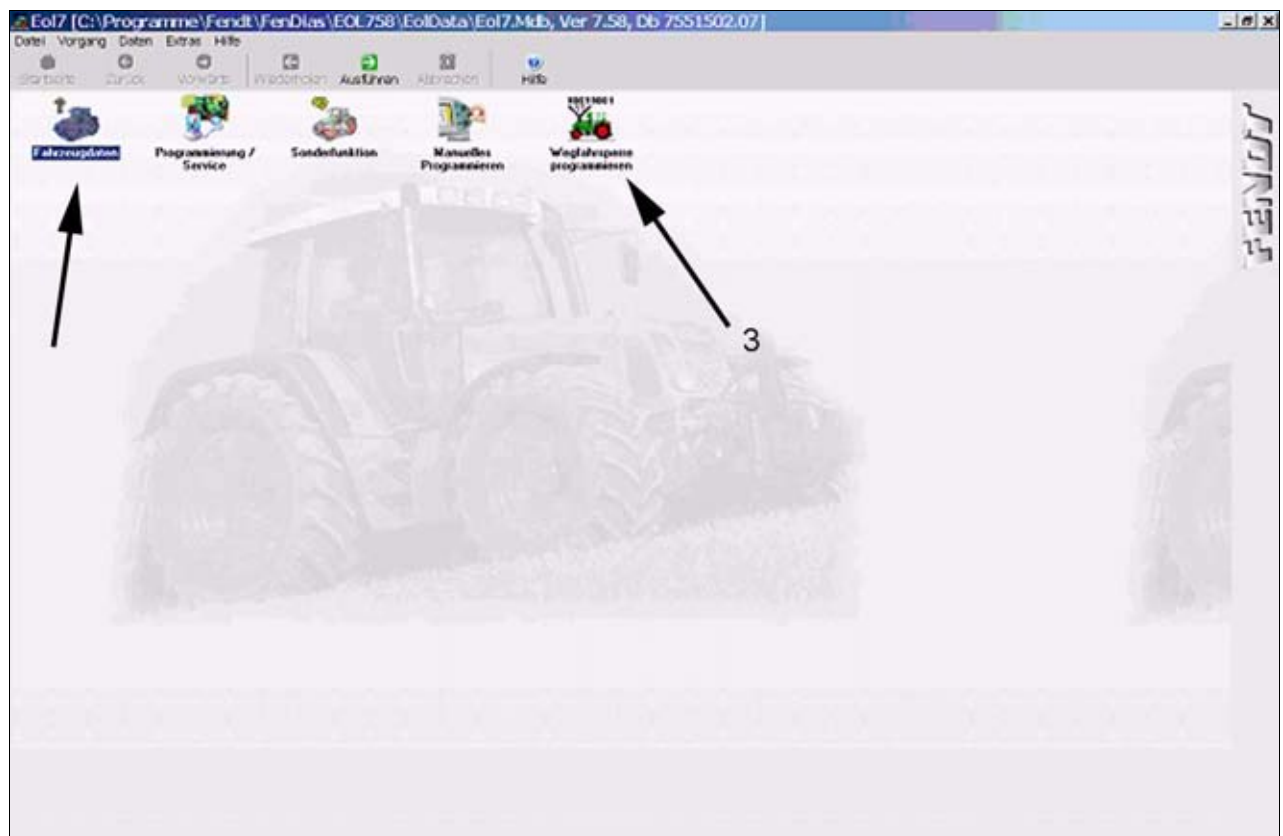


Fig. 5.

1002083

NOTE: On programming

- Observe charge level of G001 battery

1. Ignition ON.

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-

T000737
Version 2
27-01-2010

2. Start EOL7.58 DB7.55 (or higher)
3. Double-click "Program immobiliser" to change to menu page

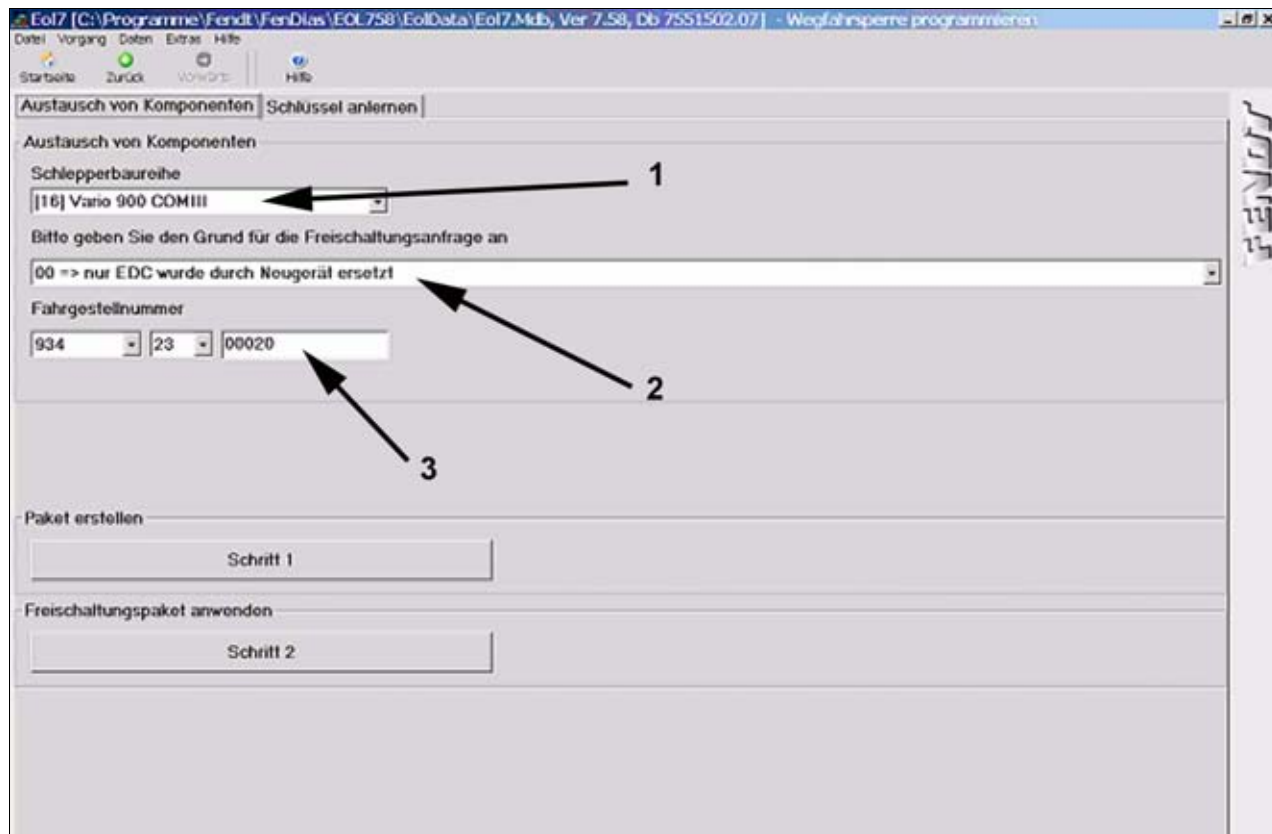


Fig. 6.

1002084

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)

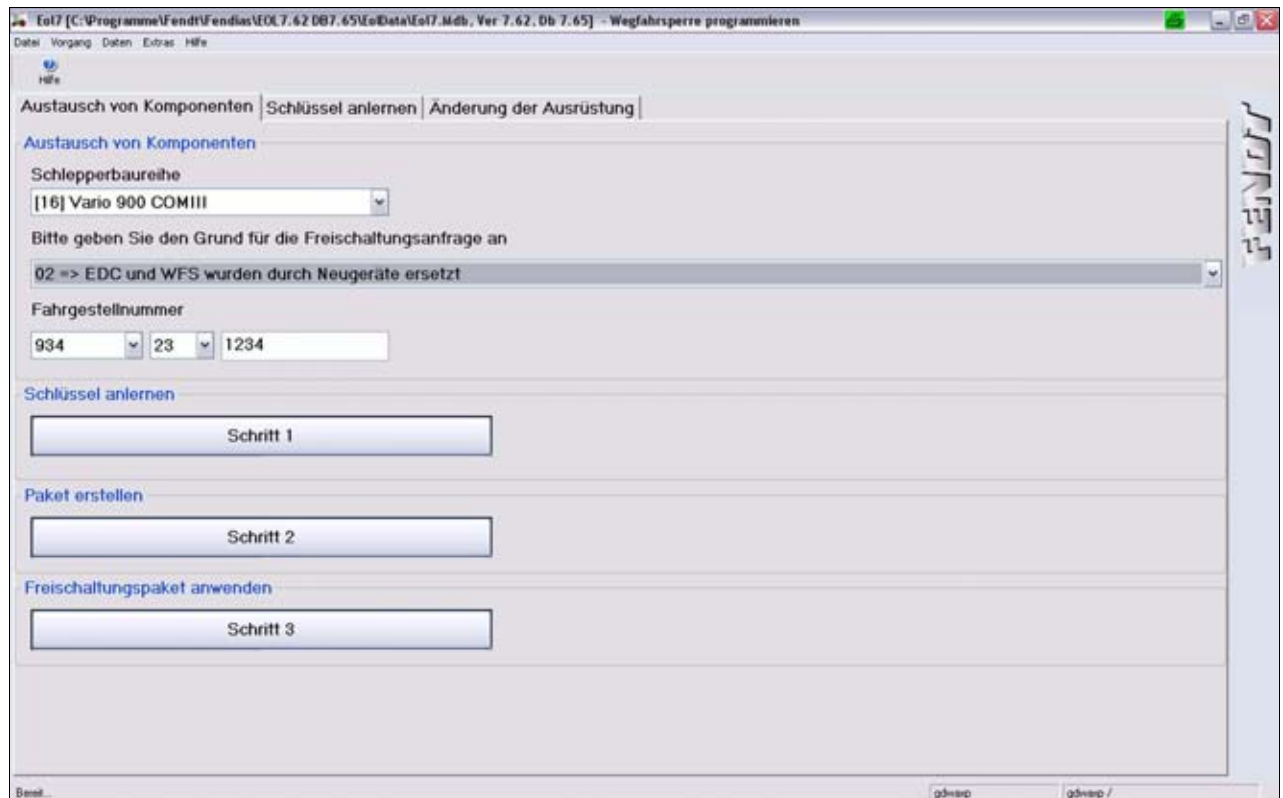


Fig. 7.

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)

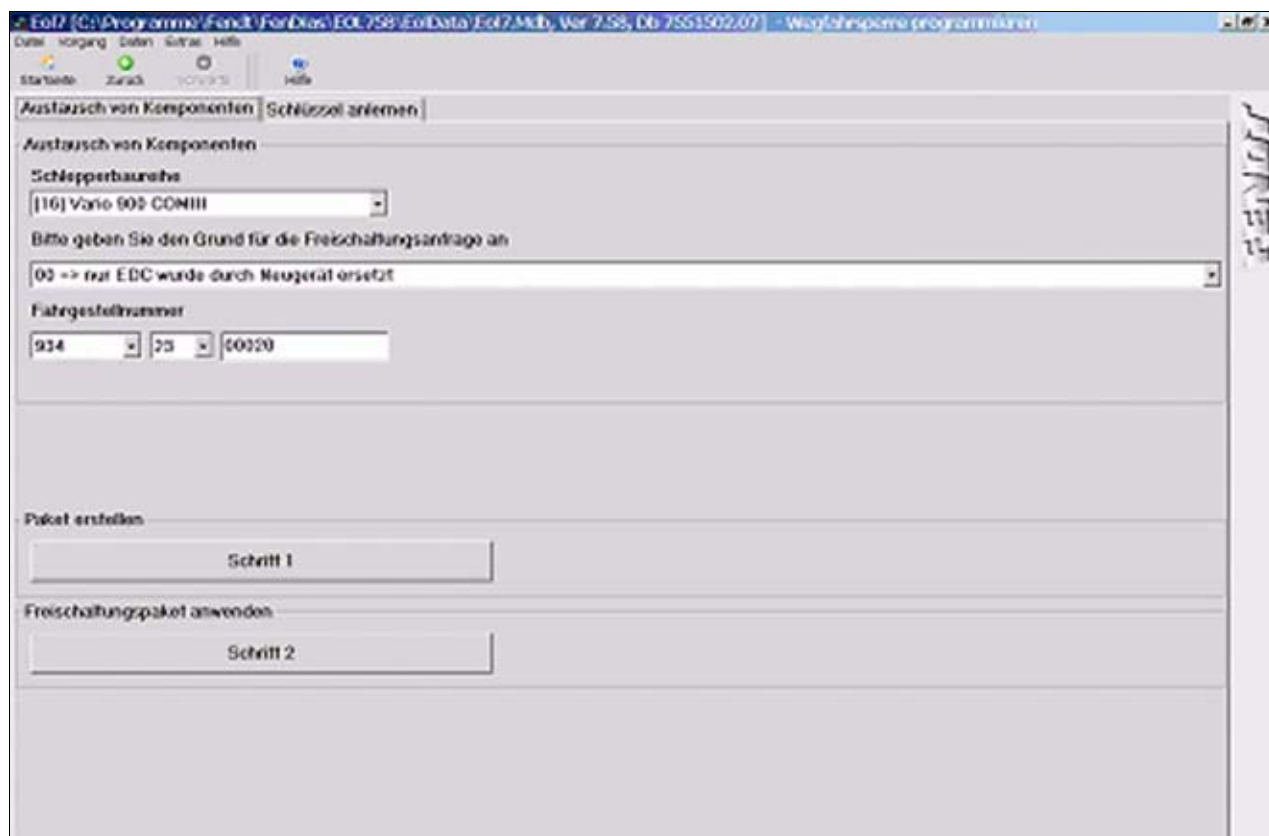


Fig. 8.

1002086

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):

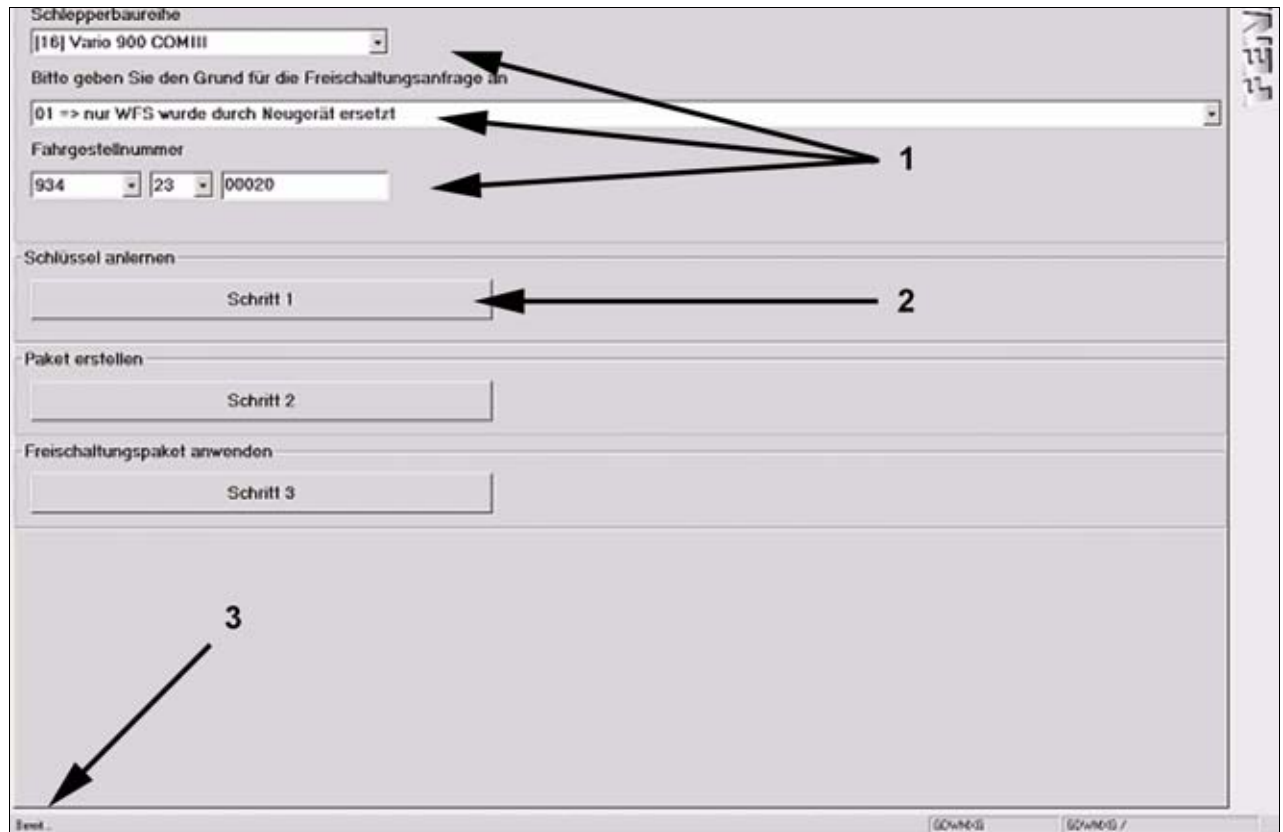


Fig. 9.

1002087

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.

1002088

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

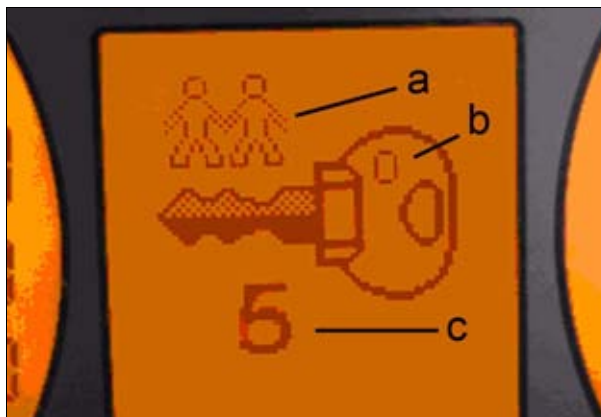


Fig. 11.

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)

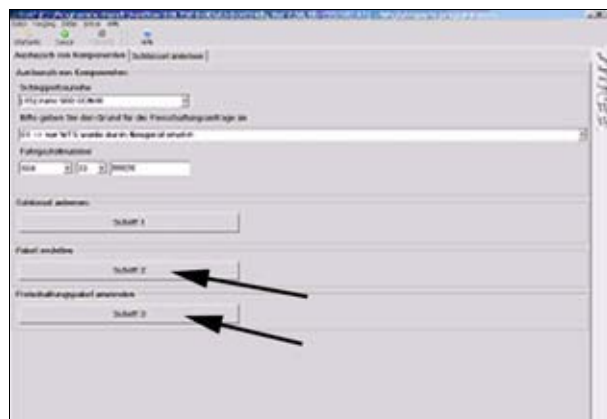


Fig. 14.

I002269

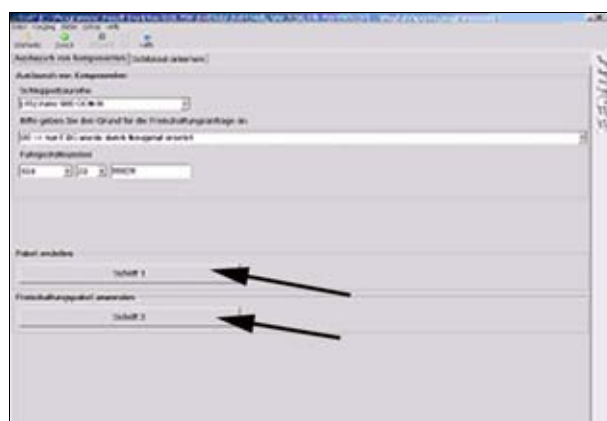
B)

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.

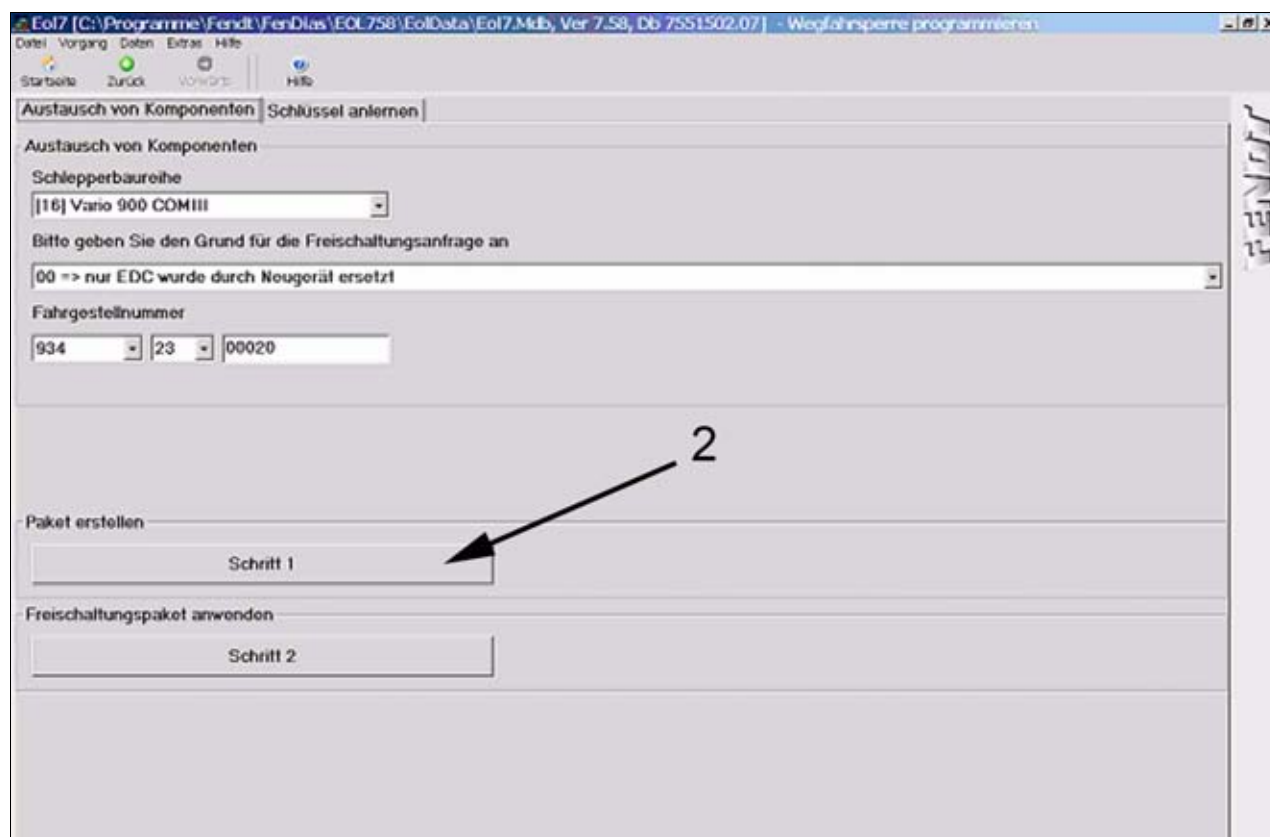


Fig. 16.

1002271

1. Ignition on
2. Click "Create package"

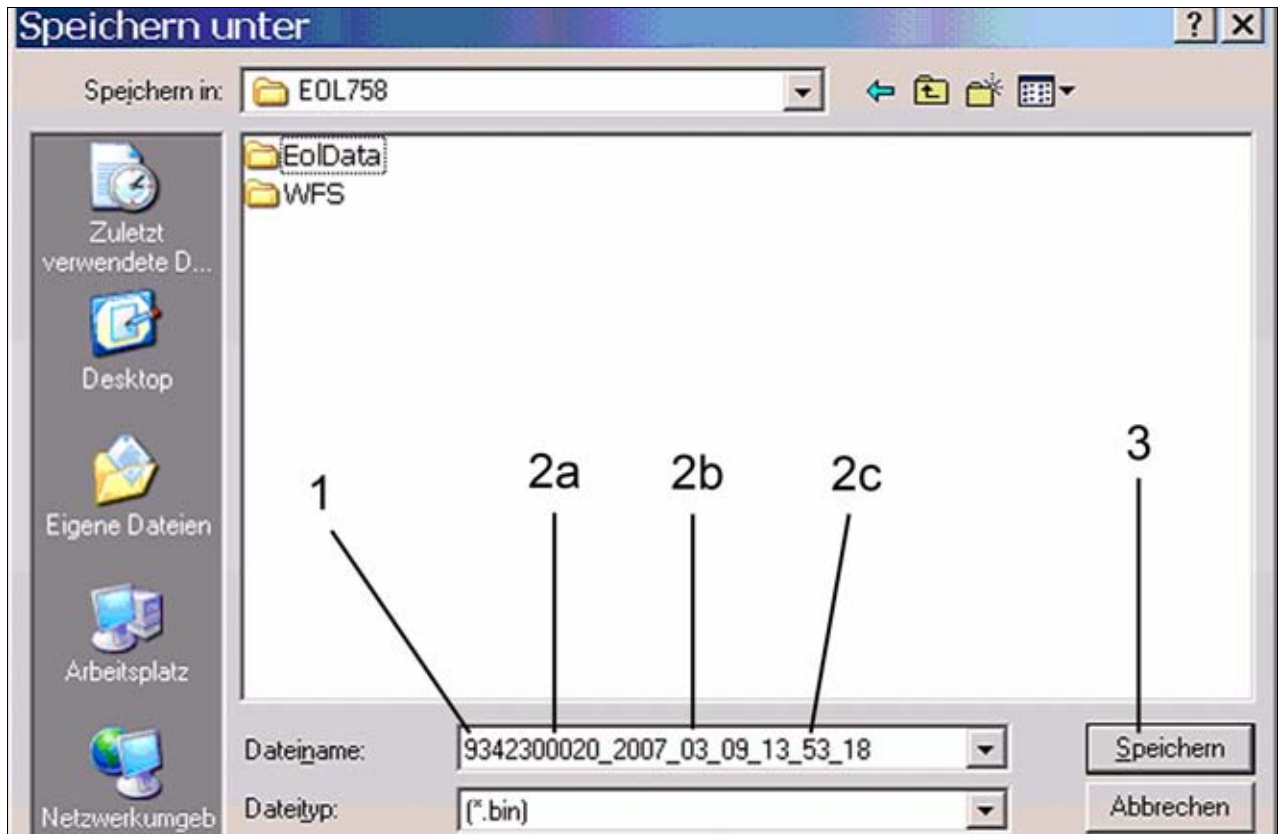


Fig. 17.

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.

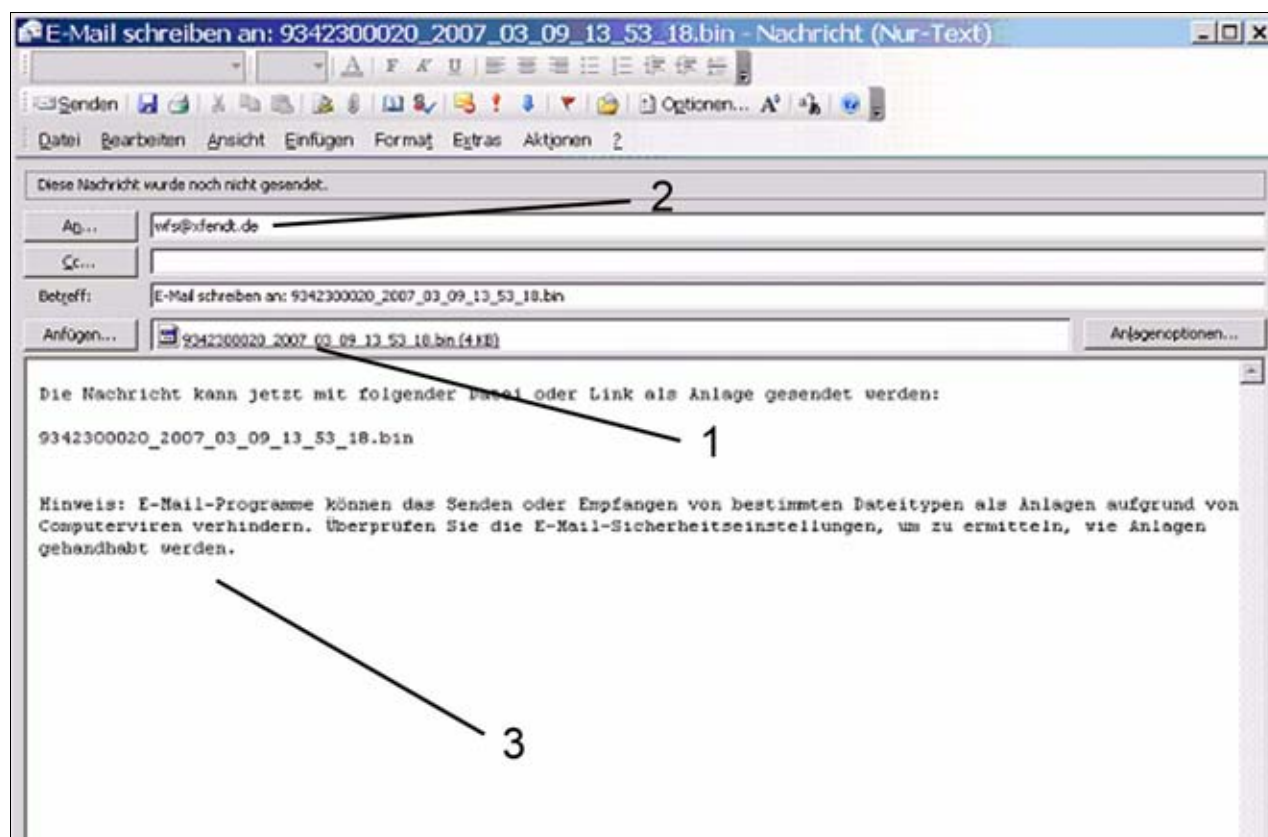


Fig. 18.

1002273

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:

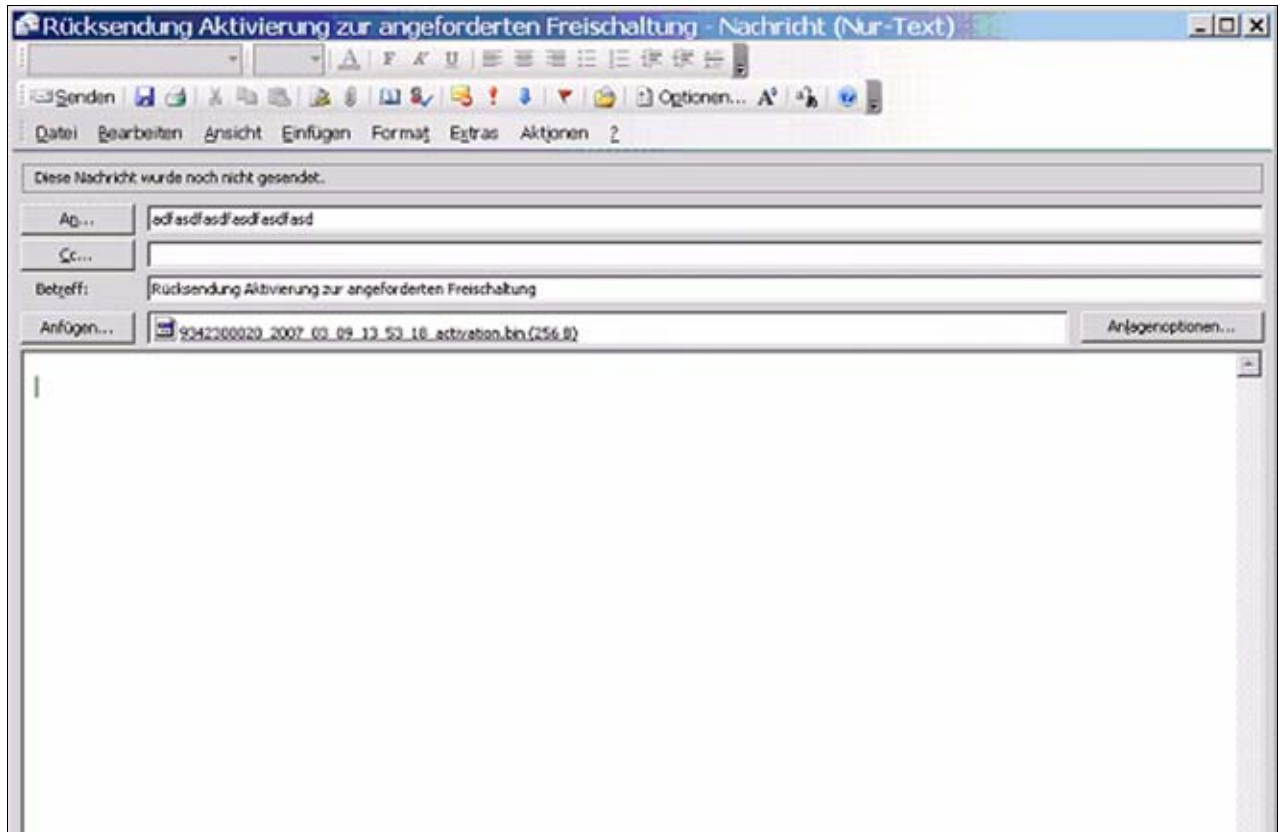


Fig. 19.

I002274

Fendt strives to return the activation request in the shortest time possible.

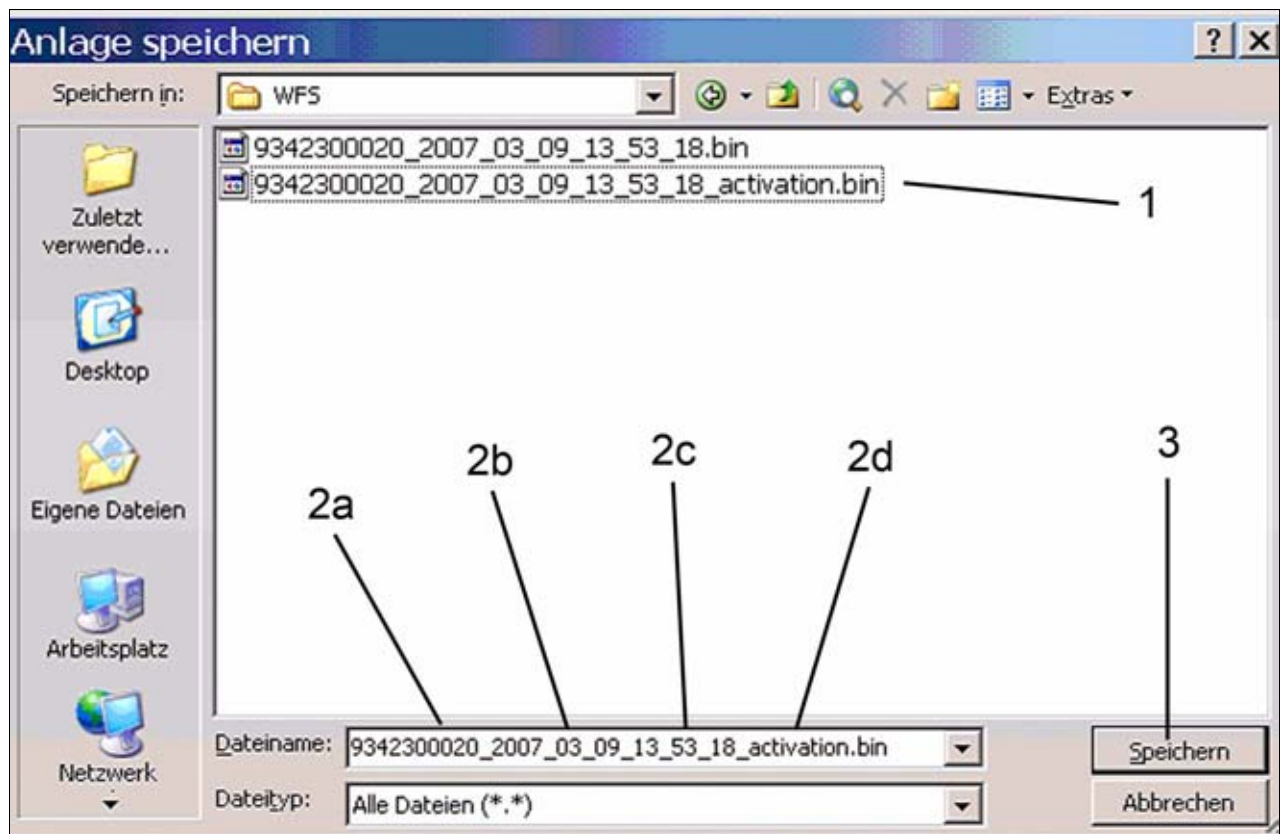


Fig. 20.

I002275

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-

T000737
Version 2
27-01-2010

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.

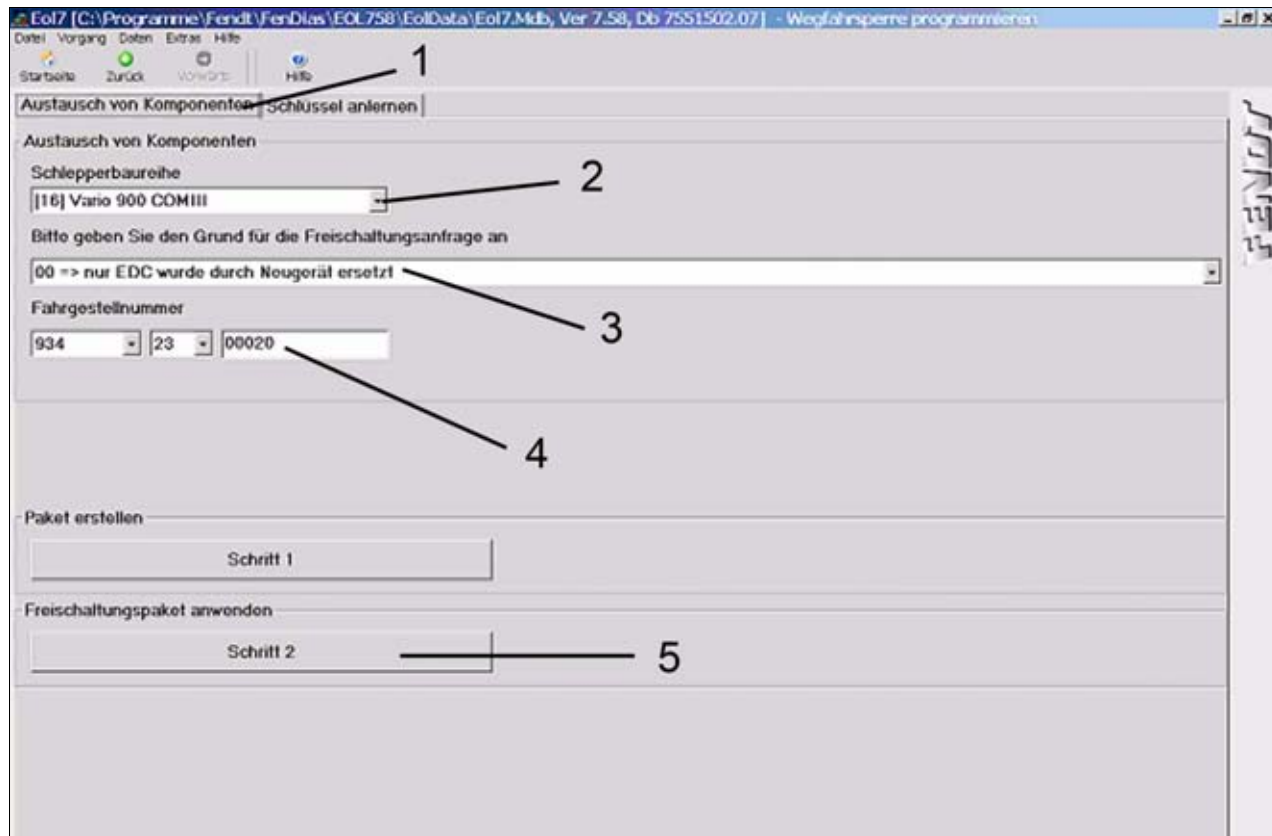


Fig. 21.

1002278

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"

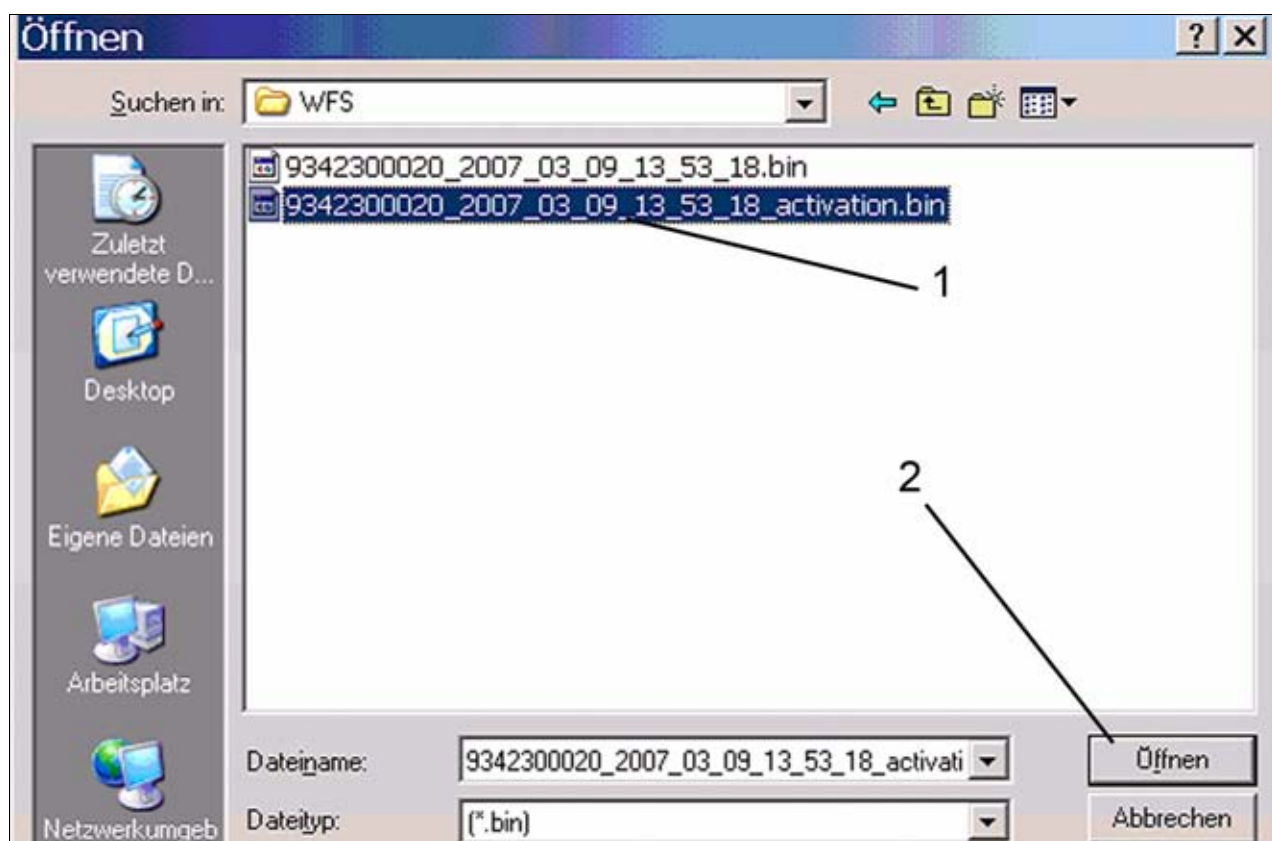


Fig. 22.

I002279

1. Select activation file.
2. Select the correct file with the ending "..._activation.bin" and read in by clicking "Open".

Fig. 23.

1002280

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.