1.3.3.2 Opening / closing the hood

1.3.3.2.1 Opening the hood

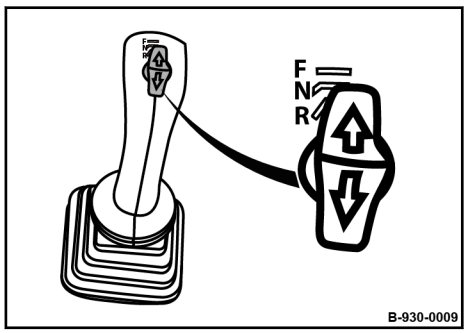


Fig. 37

1. Start the engine .
2. Turn the travel direction switch to position “N”.
   ⇨ The neutral position control light lights up.

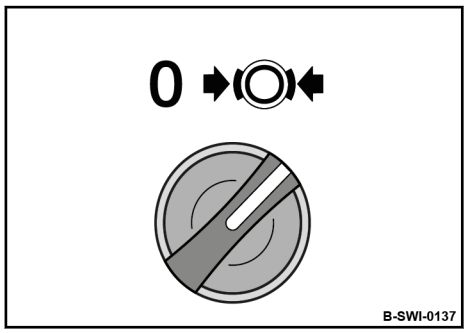


Fig. 38

3. Turn the rotary switch for the parking brake to position “Right”.
   ⇨ The parking brake warning light lights up.

WARNING!

Danger of crushing when opening/closing the hood!

– Make sure that no persons are in the danger area.

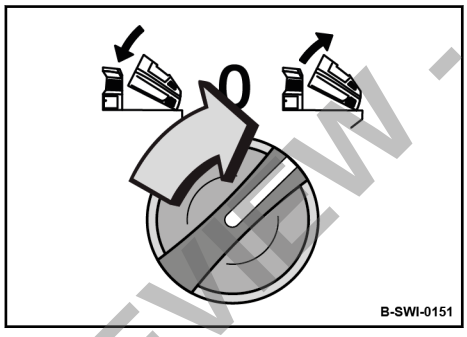


Fig. 39

4. Actuate the rotary button for the hood to the right and hold it, until the hood is completely open.

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1	Drive shaft	7	Auxiliary pump (optional)
2	Retracting plate	8	High pressure side
3	Control piston	9	Cylinder
4	Control unit	10	Piston
5	Valve plate	11	Slipper pad
6	Low pressure side	12	Swashing cradle

Hydraulic diagram

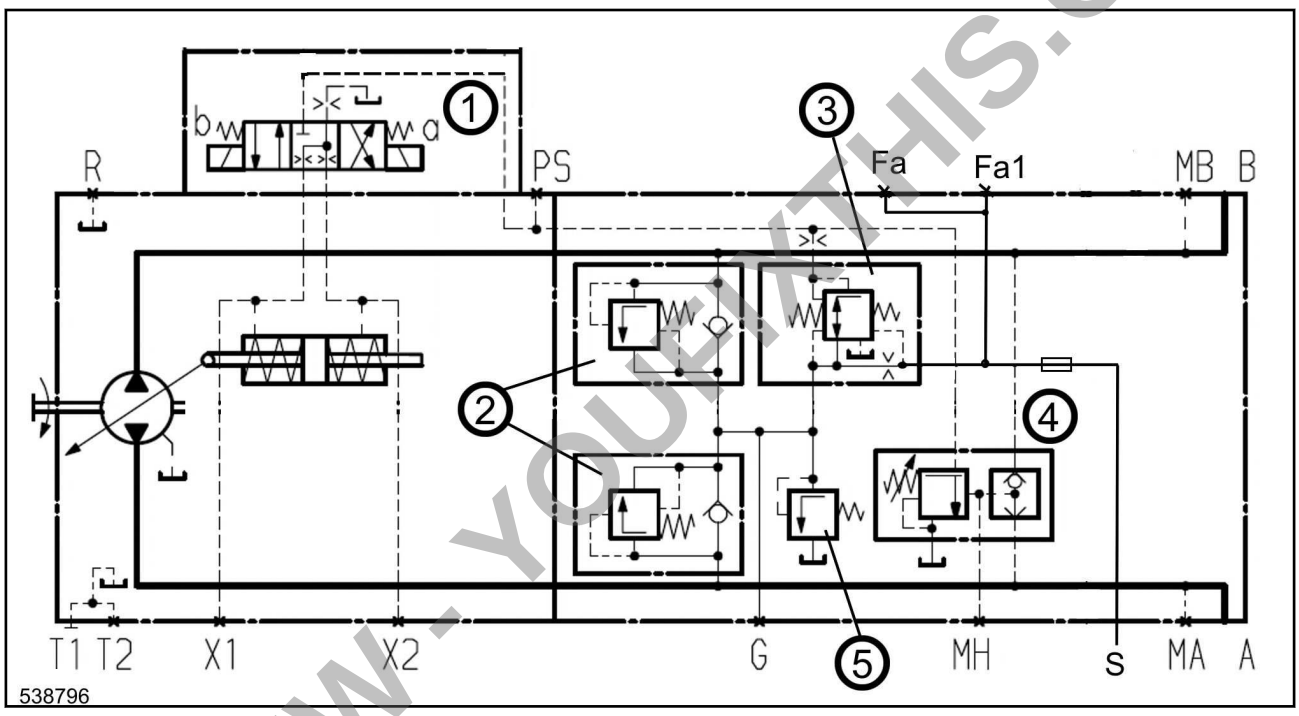


Fig. 174: Hydraulic diagram, A4VG DA

1	Control unit	4	Pressure override
2	High pressure limitation	5	Charge valve
3	DA-control valve		

Connection overview

A	Work connection	M_H	Port for balanced high pressure
B	Work connection	P_S	Control pressure inlet
G	Pressure port for charge circuit	R	Ventilation
Fa	Filter outlet	S	Suction line for charge oil
Fa1	Filter outlet (attachment filter)	T_1	Leak oil

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DTC-List

Diagnosis- and Errorcodes

referrenced ECU-Software
P490_: 220, 310, 501
P491_: 220, 310, 400, 501
P492_: 213
P513_: 214, 300

Deutz-Code / SPN / Fehlername ..... Seite

11 / 107 / AirFltSysReac 3
12 / 91 / APP1 3
14 / 91 / APPPwm 3
15 / 91 / APPPwmPer 4
16 / 108 / APSCD 4
17 / 729 / ArHt1 4
18 / 730 / ArHt2 5
19 / 676 / ArHtCD_NoLd 5
20 / 676 / ArHtCD_RlyErr 5
22 / 168 / BattCD 6
23 / 168 / BattCDSysReac 6
24 / 523561 / BIPCyl1 6
25 / 523562 / BIPCyl2 7
26 / 523563 / BIPCyl3 7
27 / 523564 / BIPCyl4 7
28 / 523565 / BIPCyl5 8
29 / 523566 / BIPCyl6 8
30 / 523567 / BIPCyl7 8
31 / 523568 / BIPCyl8 9
32 / 102 / BPSCD 9
33 / 102 / BPSCDSysReac 9
37 / 111 / CLSCDSysReac 10
38 / 1323 / CmbChbMisfire1 10
39 / 1324 / CmbChbMisfire2 10
40 / 1325 / CmbChbMisfire3 11
41 / 1326 / CmbChbMisfire4 11
42 / 1327 / CmbChbMisfire5 11
43 / 1328 / CmbChbMisfire6 12
44 / 1450 / CmbChbMisfire7 12
45 / 1451 / CmbChbMisfire8 12
46 / 1322 / CmbChbMisfireMul 13
47 / 1346 / CmbChbSysReac 13
48 / 1109 / CoEngShOffDemIgr 13
52 / 1072 / CRERCD 14
53 / 1081 / CSLpCD 14
54 / 704 / CTLpCD 14
55 / 110 / CTSCD 15

Deutz-Code / SPN / Fehlername ..... Seite

56 / 110 / CTSCDSysReac 15
57 / 701 / Dummy1CD_Max 15
58 / 701 / Dummy1CD_Min 16
59 / 701 / Dummy1CD_SigNpl 16
60 / 702 / Dummy2CD_Max 16
61 / 702 / Dummy2CD_Min 17
62 / 702 / Dummy2CD_SigNpl 17
69 / 2791 / EGRCD_Max 17
70 / 2791 / EGRCD_Min 18
71 / 2791 / EGRCD_SigNpl 18
72 / 2791 / EGRCDIntEGR 18
74 / 923 / EngCDTrqCalcOut 19
75 / 190 / EngMBackUp 19
76 / 190 / EngMCaS1 19
77 / 190 / EngMCrS1 20
78 / 190 / EngMOfsCaSCrS 20
79 / 190 / EngPrtSysReacFOC 20
80 / 190 / EngPrtSysReacORC 21
81 / 703 / ESLpCD 21
82 / 1074 / ExFICD 21
83 / 975 / FanCD 22
85 / 1639 / FanCDEval 22
86 / 523602 / FanCDSysReac 22
87 / 97 / FIFCD 23
89 / 97 / FIFCD_WtLvl 23
90 / 94 / FIPSCD 23
91 / 94 / FIPSCDSysReac 24
94 / 523239 / FrmMngDecV1 24
95 / 523240 / FrmMngFunModCtl 24
106 / 523212 / FrmMngTOEngPrt 25
110 / 523216 / FrmMngTOPrHtEnCmd 25
112 / 523218 / FrmMngTORxCCVS 25
113 / 523604 / FrmMngTORxEngTemp 26
117 / 523238 / FrmMngTOSwtOut 26
118 / 523222 / FrmMngTOTCO1 26
120 / 523605 / FrmMngTOTSC1AE 27
121 / 523606 / FrmMngTOTSC1AR 27

Deutz-Code / SPN / Fehlername ..... Seite

122 / 523607 / FrmMngTOTSC1DE 27
123 / 523608 / FrmMngTOTSC1DR 28
124 / 523609 / FrmMngTOTSC1PE 28
125 / 898 / FrmMngTOTSC1TE 28
126 / 520 / FrmMngTOTSC1TR 29
127 / 523610 / FrmMngTOTSC1VE 29
128 / 523611 / FrmMngTOTSC1VR 29
131 / 523500 / FrmMngTxTO 30
133 / 174 / FTSCD 30
134 / 174 / FTSCDSysReac 30
136 / 523618 / GOTSCD 31
137 / 523619 / GOTSCDSysReac 31
138 / 29 / HdThrt 31
139 / 1638 / HOTSCD 32
140 / 1638 / HOTSCDSysReac 32
141 / 523617 / HWEMonCom 32
142 / 630 / HWEMonEEPROM 33
143 / 523612 / HWEMonRcyLocked 33
144 / 523612 / HWEMonRcySuppressed 33
145 / 523612 / HWEMonRcyVisible 34
146 / 523612 / HWEMonUMaxSupply 34
147 / 523612 / HWEMonUMinSupply 34
149 / 105 / IATSCD 35
150 / 105 / IATSCDSysReac 35
153 / 523350 / InjVlvBnk1A 35
154 / 523351 / InjVlvBnk1B 36
155 / 523352 / InjVlvBnk2A 36
156 / 523353 / InjVlvBnk2B 36
157 / 523354 / InjVlvChipA 37
158 / 523355 / InjVlvChipB 37
159 / 651 / InjVlvCyl1A 37
160 / 651 / InjVlvCyl1B 38
161 / 652 / InjVlvCyl2A 38
162 / 652 / InjVlvCyl2B 38
163 / 653 / InjVlvCyl3A 39
164 / 653 / InjVlvCyl3B 39
165 / 654 / InjVlvCyl4A 39

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Table of contents

1 General ... **9**
1.1 Introduction ... **10**
1.2 Concerning your safety ... **12**
1.2.1 Basic prerequisites ... 12
1.2.2 Definition of responsible persons ... 15
1.2.3 Fundamentals for safe operation ... 16
1.2.4 Handling fuels and lubricants ... 18
1.2.5 Loading / transporting the machine ... 24
1.2.6 Start up procedure ... 25
1.2.7 Driving the machine; working operation ... 26
1.2.8 Refuelling ... 28
1.2.9 Emergency procedures ... 28
1.2.10 Maintenance work ... 29
1.2.11 Repair ... 31
1.2.12 Signage ... 31
1.3 Maintenance and repair ... **38**
1.3.1 Notes on repair ... 38
1.3.2 Preliminary remarks and safety notes ... 54
1.3.3 Preparations / concluding work ... 55
1.3.4 Parking the machine in secured condition ... 60
2 Technical data ... **63**
2.1 Technical data ... **64**
2.1.1 Noise and vibration data ... 67
2.2 Additional technical data ... **68**
2.3 Terms and basis of calculation ... **71**
2.4 Fuels and lubricants ... **72**
2.4.1 Engine oil ... 72
2.4.2 Fuel ... 73
2.4.3 Coolant ... 74
2.4.4 Hydraulic oil ... 77
2.4.5 Gear oil SAE 80W-140 ... 77
2.4.6 Lubrication grease ... 78
2.5 List of fuels and lubricants ... **79**
3 Overview of machine ... **81**
3.1 General information ... **82**
3.2 Electric systems ... **85**
3.3 Overview of hydraulics ... **87**
3.4 Machine assemblies ... **90**
3.4.1 Diesel engine ... 90
3.4.2 Air conditioning ... 92
3.4.3 Central lubrication system ... 93
3.4.4 Overview of maintenance flaps and doors ... 96
4 Electric systems ... **97**
4.1 Basic principles ... **99**

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Table of contents

4.1.1 Measuring method ... 99
4.1.2 Understanding circuit diagrams ... 104
4.1.3 Telemecanique switch ... 115
4.1.4 Deutsch plug, series DT and DTM ... 117
4.1.5 Magnetic coil plug ... 121
4.1.6 Clip-on technology ... 123
4.2 Overview of electric system ... 127
4.2.1 Operator's stand ... 129
4.2.2 Wiring ... 131
4.2.3 CAN BUS overview ... 137
4.2.4 Table of fuels and lubricants ... 138
4.3 Starting the engine with jump leads ... 148
4.4 Installation locations of control units ... 149
4.5 Fuse assignment ... 154
4.5.1 Notes on safety ... 154
4.5.2 Central electrics ... 154
4.5.3 Main fuses ... 155
4.5.4 Control console cabin ... 156
4.6 Description of electrical components ... 157
4.6.1 Control console cabin ... 163
4.6.2 Control unit for air conditioning, A72 ... 165
4.7 Training of electric system ... 168
4.8 Inspection and maintenance work ... 226
4.8.1 Maintenance Table ... 226
4.8.2 Every 500 operating hours ... 226
4.8.3 As required ... 227
5 Hydraulic system ... 229
5.1 Basic principles ... 231
5.1.1 Open and closed hydraulic circuit ... 231
5.1.2 Swash plate principle, pump ... 233
5.1.3 Swash plate principle, motor ... 234
5.1.4 External gear pumps ... 236
5.2 Overview of hydraulics ... 238
5.3 Description of hydraulic components ... 243
5.3.1 Travel pump, A4VG71 DA ... 243
5.3.2 Travel pump, A4VG71 DG ... 250
5.3.3 Fan pump, A4VG56 EF-EP ... 256
5.3.4 Steering and working pump, A10VO/VSO ... 261
5.3.5 Travel motor, A6VM HA2T ... 266
5.3.6 Fan motor ... 270
5.4 Description of hydraulic circuits ... 272
5.4.1 Charge circuit, engine hood, brake and travel speed range selection ... 273
5.4.2 Travel system ... 280
5.4.3 Cooling system ... 284
5.4.4 Working hydraulics ... 290
5.5 Tests and adjustments ... 294

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Taking into operation

- Bleed the hydraulic circuits.
- Start up the hydraulic system without load.
- Check the hydraulic oil level in the tank, if necessary top up with hydraulic oil as specified in the operating and maintenance instructions or drain oil off into a suitable container.

After taking into operation

- Check fittings and flanges for leaks.
- After each repair check all adjustment data, system pressures, rotational speeds and nominal values in the hydraulic system, adjust if necessary.
- Do not adjust pressure relief valves and control valves to values above their specified values.

1.3.1.1.3 Repair notes for Common Rail engines

Special requirements with respect to cleanliness in the fuel system do apply for commissioning, maintenance and repair work, particularly for engines with the Common Rail System. Contamination like dirt, welding residues or similar can lead to the failure of individual components and adversely affect engine operation.



Fig. 25: Example

Spare parts should be left in their original packaging as long as possible and should only be unpacked just before use.

When parts are unpacked any connections must be closed with suitable plugs or caps, in order to prevent contamination of hose connections. If e.g. fuel hoses are connected to one side, while the second side cannot yet be connected, there is a danger of dirt entering into the system. The free connection must in this case also be appropriately closed.

Notes and measures to be applied before starting work in the fuel system

- The fuel system must be closed. Visual examination for leaks / damage in the fuel system.
- Before starting work in the fuel system clean the complete engine and the engine compartment with the system still closed.
- The engine should be dry before work is started in the fuel system.
- Blow drying with compressed air is only permitted while the fuel system is still closed.

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2.4.6 Lubrication grease

For lubrication purposes use an EP-high pressure grease, lithium saponified (penetration 2), acc. to DIN 51502 KP 2G.

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4.1.3 Telemecanique switch

Dismantling

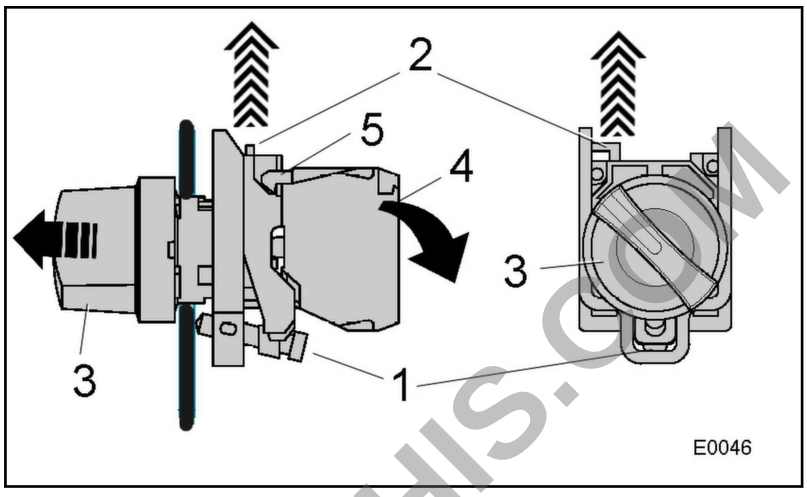


Fig. 96

1. Lift up the interlock (5).
2. Fold down the switch block (4).
3. Loosen the screw (1).

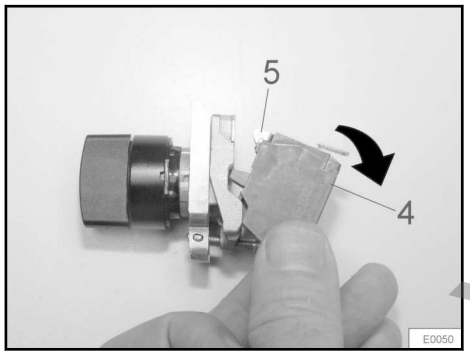


Fig. 97: Folding down the switch block

4. Lift up the interlock (2) and pull out the front element (3).

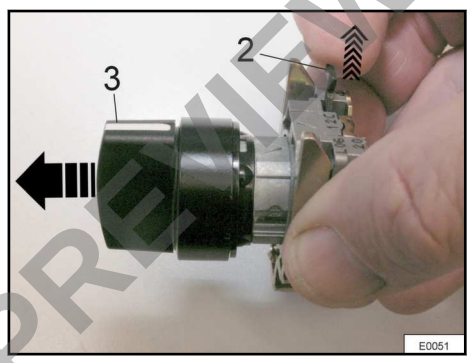


Fig. 98: Pulling out the front element

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S432 Switch for emergency operating mode If the sensors or the ESX machine control (A34) fail, the engine control unit (A48) is able to use the diesel engine's idle speed to provide limp-home functions. By flipping the switch (S432), the engine speed in emergency operating mode can be increased to 1500 min^{-1}.

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ESX terminal	Signal description	Nominal values (voltage / current)	
X35:36	Input **D+ generator**	Engine running / engine is being started	24 V
	Digital input active high	Engine stopped	0 V
X35:37	Input **seat contact switch**	Arm rest down/seat occupied	0 V
	Digital input active high	Arm rest top position/seat empty	approx. 9 V
X35:38	Input **steering joystick left**	Joystick operated to the left	24 V
	Digital input active high	Joystick not actuated	approx.2 V
X35:39	Input **steering joystick right**	Joystick actuated to the right	24 V
	Digital input active high	Joystick not actuated	approx.2 V
X35:40	Input **switch brake**	Release brake	24 V
	Digital input active high	Apply brake	approx.2 V
X35:41	Input **joystick dozer blade up**	Joystick actuated to the rear	24 V
	Digital input active high	Joystick not actuated	approx.2 V
X35:42	Output **dozer blade down**	Dozer blade is moved	0.3..0.8 A
	PWM digital output (max. 4 A)	Dozer blade is not moved	0 A
X35:43	Not used		
X35:44	Output **Travel speed range selection**	Speed range 1	24 V
	PWM digital output (max. 4 A)	Speed range 2	0 V
X35:45	Not used		
X35:46	Not used		
X35:47	Not used		
X35:48	Not used		
X35:49	Output **steering left**	Steering active	0.3..0.8 A
	PWM digital output (max. 4 A)	Steering not active	0 A
X35:50	Not used		
X35:51	Not used		
X35:52	Input **hydraulic oil level float**	Oil level ok	approx.9 V
	Digital input active low	Oil level too low	0 V

22/57

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4.8.2.1.2 Checking the main battery switch

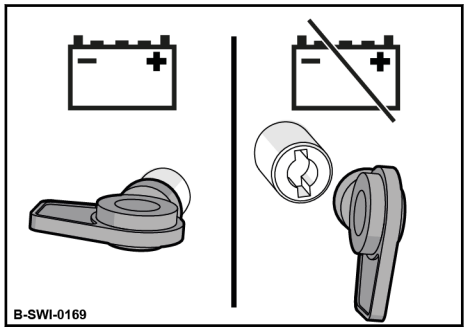


Fig. 160

1. Turn the main battery switch counter-clockwise and pull it out.
2. Check by turning the ignition key, whether the batteries are disconnected from the electric system of the machine.

4.8.3 As required

4.8.3.1 Battery service during prolonged machine downtimes

WARNING!

Danger of injury caused by exploding gas mixture!

- Remove the plugs before starting to recharge the battery.
- Ensure adequate ventilation.
- Smoking and open fire is prohibited!
- Do not lay any tools or other metal objects on the battery.
- Do not wear jewellery (watch, bracelets, etc.) when working on the battery.
- Wear your personal protective equipment (protective gloves, protective clothing, goggles).

Protective equipment:
- Working clothes
- Protective gloves
- Safety goggles

1. Switch off all consuming devices (e.g. ignition, light).
2. Measure the open-circuit voltage of the battery at regular intervals (at least 1 x per month).
   ⇨ Reference values: 12.6 V = fully charged; 12.3 V = discharged to 50%.
3. Recharge the battery immediately after an open-circuit voltage of 12.25 V or less is reached. Do not perform boost charging.
   ⇨ The open-circuit voltage of the battery occurs approx. 10 hours after the last charging process or one hour after the last discharge.
4. Switch off the charging current before removing the charging clamps.
5. After each charging process allow the battery to rest for one hour before taking it into service.

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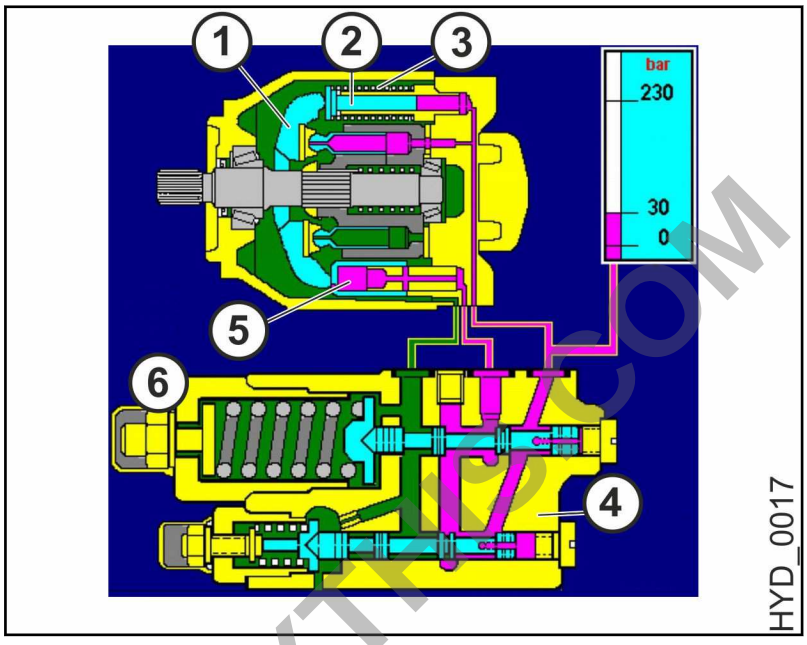


Fig. 200

1 Swash plate
2 Control piston
3 Spring
4 Pressure control
5 Resetting piston
6 Flow control valve

When the engine is started, pressure will build up at the outlet of the pump. This pressure moves the pressure controller (4) to the adjusted value and opens a connection to the resetting piston (5). Since the effective area of this resetting piston is much bigger than the area of the control piston (2), despite the spring force, the increasing pressure holds the swash plate (1) at a fixed swashing angle, in relation to the set value of the pressure regulator. The setting of the flow control valve ensures a so-called “stand-by pressure” in the system.

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9. Should the pressure of 28 bar not be reached, repeat the basic adjustment with a pressure higher than 30 bar, but on both valves identical.

Check and adjust the other tandem pump accordingly.

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S432 Switch for emergency operating mode If the sensors or the ESX machine control (A34) fail, the engine control unit (A48) is able to use the diesel engine's idle speed to provide limp-home functions. By flipping the switch (S432), the engine speed in emergency operating mode can be increased to 1500 min^{-1}.

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Protective equipment:
- Working clothes
- Protective gloves

1. Park the machine in secured condition ↳ *Chapter 1.3.4 „Parking the machine in secured condition“ on page 60*.

WARNING!
Danger of burning on hot components!
– Wear your personal protective equipment (protective gloves, protective clothing).
– Avoid touching hot components.

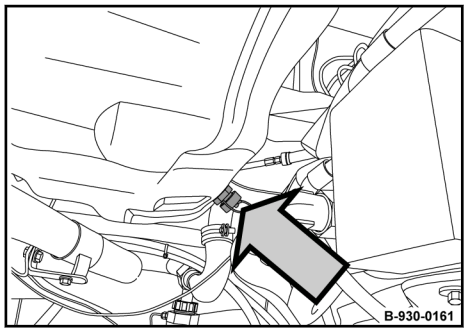


Fig. 326

2. Connect the drain hose and collect running out oil.
   ⇨ The drain valve opens when the drain hose is screwed on.
3. Unscrew the drain hose again.

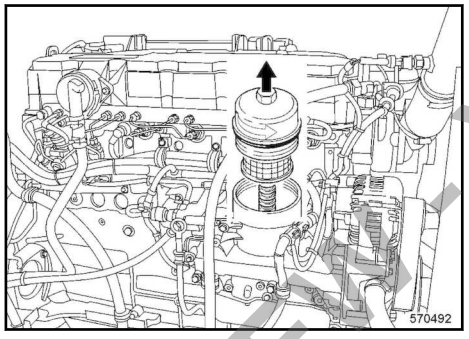


Fig. 327

4. Thoroughly clean the filter housing and the surrounding area.

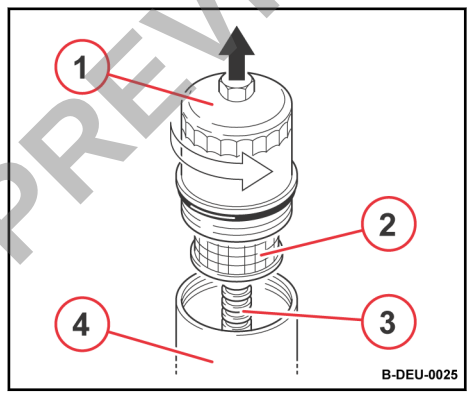


Fig. 328

5. Loosen the cap (1) with 2 or 3 turns and wait for approx. 30 seconds.
6. Unscrew the cap with the filter element (2).
7. Carefully pull the filter element up and out of its guide (3) in the housing.

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6.3.1.4.4 Welding on pad foot caps

This work shall only be performed by qualified specialists.

The caps should be replaced at the latest when the front faces collapse!

WARNING!

Danger of accident!

Perform all work only with the engine shut down and after actuating the emergency stop switch.

Wear goggles and proper working gloves during all work.

NOTICE!

When performing electric welding work on the refuse compactor, the plug connectors must be pulled off the control units as a measure to protect the electronics in engine control unit and ESX.

Perform welding work only at ambient temperatures above 18 °C.

Filler materials	
Inert-gas-shielded arc welding: alkaline flux-cored welding electrodes	
DIN EN 758	T 42 4 B M H5 (old)
EN 17632	T 42 4 B M H5 (new)
AWS/ASME SFA	E70T-5 H4
Electric manual welding: alkaline flux-cored welding electrodes	
DIN EN 499	E 42 6 B 42 H5
AWS/ASME SFA-5.1	E7018-1-H4

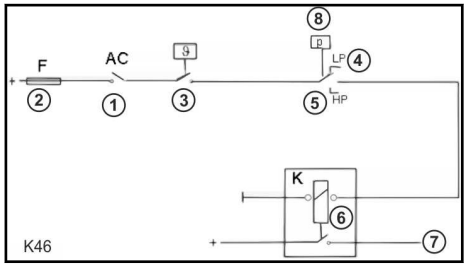
Important information

- Weld wire thickness 1.4 mm
- Welding rod thickness 4.0 mm
- Before welding heat up rod-shaped electrodes for 2 h at 300 °C
- Weld regions must be dry before and during welding
- Electrode welding: Weld buildup identical with inert gas shielded welding, number of layers approx. 60% more
- Weld wire must be dry and free of corrosion

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Monitoring chain



1 Switches
2 Fuse
3 Thermostat
4 Low pressure switch contact
5 High pressure switch contact
6 Relays
7 Connection for magnetic clutch
8 Pressure switch

Fig. 456: Monitoring chain

6.5.8 Description of components

Condenser

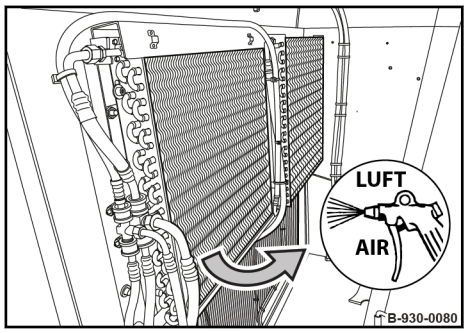


Fig. 457

The condenser emits heat energy from the system into the surrounding air and liquefies the gaseous refrigerant.

The fins must be free of dirt and damage.

NOTICE!
New compressor oil
When replacing a heat exchanger, e.g. evaporator or condenser, any compressor oil lost by exchanging the components, must be replaced with fresh oil.

Dryer / filter / fluid container / inspection glass

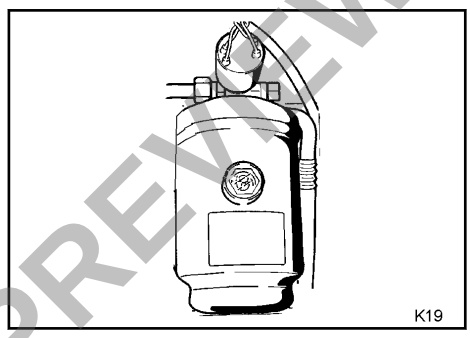


Fig. 458

Dryer / filter

The fluid container collects the fluid drops and passes these then as a constant flow to the expansion valve. Moisture that has entered during assembly of the refrigerant circuit is absorbed by a dryer in the fluid container.

At evaporation temperatures below zero the refrigerant will deposit previously absorbed moisture on the expansion valve, where this water turns into ice and thus adversely affects the controllability of the expansion valve. Moreover, moisture in the refrigerant circuit causes corrosion, forms acids and enters into chemical compositions.

Inside the refrigerant container the heavy liquid refrigerant collects in the lower part of the container, flows through a rising pipe to the outlet marked "A" and thus ensures bubble free operation of the expansion valve.

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7.1 Preliminary remarks **489**
7.2 Emergency procedures **490**
7.2.1 Actuating the emergency stop switch 490
7.2.2 Emergency exit 490
7.2.3 Disconnect the battery 490
7.2.4 Towing the machine 490
7.2.5 After towing 493
7.3 Troubleshooting, electrical systems **495**
7.3.1 Preliminary remarks 495
7.3.2 Starting the engine with jump leads 498
7.3.3 Checking the main battery switch 499
7.3.4 Fuse assignment 499
7.3.5 ESX, checking the electric power supply 502
7.3.6 Diagnostics concept 510
7.4 Trouble shooting, diesel engine **513**
7.4.1 Engine faults 513
7.4.2 Starting the engine with jump leads 515
7.4.3 Operating the engine emergency mode 516
7.4.4 Deutz DTC fault code list, EMR3 517
7.5 Trouble shooting, hydraulics **584**
7.5.1 Emergency operation of hood 584
7.5.2 Insufficient hydraulic power 587
7.5.3 Troubleshooting axial piston pumps 590
7.5.4 Troubleshooting axial piston motors 592
7.5.5 Troubleshooting table for hydraulic components 594
7.6 Troubleshooting, air conditioning system **602**
7.6.1 Trouble shooting in refrigerant circuit, basic principles 602
7.6.2 Trouble shooting procedure 608
7.6.3 Leak test 617
7.6.4 Checking the magnetic clutch 618
7.7 Troubleshooting, central lubrication system **620**
7.7.1 Function control 620
7.7.2 Faults and causes 622
7.7.3 Fault - Cause - Remedy 624
7.7.4 Failure of central lubrication system (grease emerges from relief valve) 626
7.8 Troubleshooting, auxiliary heating **628**
7.8.1 Fuse assignment 628
7.8.2 Components 629
7.8.3 Control and safety elements 630
7.8.4 Trouble shooting 630
7.8.5 Diagnostics of control panel, old version 631
7.8.6 Diagnostics of control panel, new version 639
7.8.7 Check the fuel supply 642

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28 / 523565 / BIPCyl5

Error description INJECT. PERIOD ZYL.5
Begin of injection of cylinder 5: the ECU can not identify the magnet valve or the injection pump with the measured value of current drain at the begin of the injection

Error codes
DEUTZ-Errorcode: 28
BlinkCode (short-long-short): 5 - 3 - 5
SPN: 523565
possible FMI:
2: data stream is defective
2: data stream is defective
2: data stream is defective
2: data stream is defective

Errordetection
Errorlamp shows permanent light. Entry in errormemory.

Possible reason for error
Value outside target range or missing (cylinder 5), magnet valve or injection pump defective

Take actions for error repair
Check magnetic valve or injection pump and if necessary change them

other error properties
System reaction: No function at the moment/ Allocation check cylinder!
Behaviour error lamp: permanent light
Selfhealing: yes
Signal Priority: 3
Measurement @ errortime: actual value

29 / 523566 / BIPCyl6

Error description INJECT. PERIOD ZYL.6
Begin of injection of cylinder 6: the ECU can not identify the magnet valve or the injection pump with the measured value of current drain at the begin of the injection

Error codes
DEUTZ-Errorcode: 29
BlinkCode (short-long-short): 5 - 3 - 6
SPN: 523566
possible FMI:
2: data stream is defective
2: data stream is defective
2: data stream is defective
2: data stream is defective

Errordetection
Errorlamp shows permanent light. Entry in errormemory.

Possible reason for error
Value outside target range or missing (cylinder 6), magnet valve or injection pump defective

Take actions for error repair
Check magnetic valve or injection pump and if necessary change them

other error properties
System reaction: No function at the moment/ Allocation check cylinder!
Behaviour error lamp: permanent light
Selfhealing: yes
Signal Priority: 3
Measurement @ errortime: actual value

30 / 523567 / BIPCyl7

Error description INJECT. PERIOD ZYL.7
Begin of injection of cylinder 7: the ECU can not identify the magnet valve or the injection pump with the measured value of current drain at the begin of the injection

Error codes
DEUTZ-Errorcode: 30
BlinkCode (short-long-short): 5 - 3 - 7
SPN: 523567
possible FMI:
2: data stream is defective
2: data stream is defective
2: data stream is defective
2: data stream is defective

Errordetection
Errorlamp shows permanent light. Entry in errormemory.

Possible reason for error
Value outside target range or missing (cylinder 7), magnet valve or injection pump defective

Take actions for error repair
Check magnetic valve or injection pump and if necessary change them

other error properties
System reaction: No function at the moment/ Allocation check cylinder!
Behaviour error lamp: permanent light
Selfhealing: yes
Signal Priority: 3
Measurement @ errortime: actual value

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DTC-List
Diagnosis- and Errorcodes

referrenced ECU-Software
P490_: 220, 310, 501
P491_: 220, 310, 400, 501
P492_: 213
P513_: 214, 300

183 / 2634 / MnRly1_SCG

Error description MAIN RELAY
Main relay 1: the current drains measured by ECU is above the target range

Error codes
DEUTZ-Errorcode: 183
BlinkCode (short-long-short): 1 - 3 - 8
SPN: 2634
possible FMI:
12. Errormode not identifiable
4: Voltage to low or short circuit to -Ubatt
12. Errormode not identifiable
12. Errormode not identifiable

Errordetection
Errorlamp shows permanent light. Entry in errormemory.

Possible reason for error
Short circuit to ground (relay 1), relay defective, connection cable demaged

Take actions for error repair
Check cabling, check ECU, check relay and if necessary replace it, check connection cable and if necessary repair or replace it

other error properties
System reaction: Warning, shutoff the outputs MPROP
Behaviour error lamp: permanent light
Selfhealing: no
Signal Priority: 3
Measurement @ errortime: actual value

184 / 523420 / Montr

Error description WATCHDOG COUNTER
Internal hardware monitoring: the ECU detects an disturbance in ist monitoring module (Wachtdog)

Error codes
DEUTZ-Errorcode: 184
BlinkCode (short-long-short): 1 - 3 - 9
SPN: 523420
possible FMI:
12. Errormode not identifiable
12. Errormode not identifiable
12. Errormode not identifiable
14: Special Instructions

Errordetection
Errorlamp shows blinking. Entry in errormemory.

Possible reason for error
Watchdog counter exceeds maximum, ECU defective

Take actions for error repair
If error is not removable, change ECU

other error properties
System reaction: Recovery of ECU
Behaviour error lamp: blinking
Selfhealing: no
Signal Priority: 5
Measurement @ errortime: -

186 / 2634 / MRlyCD

Error description MAIN RELAY
Main relay: during the switching off, main relay does not switch on within an allowed time

Error codes
DEUTZ-Errorcode: 186
BlinkCode (short-long-short): 2 - 6 - 1
SPN: 2634
possible FMI:
7: Mechanical system not OK
12: Defective component
12. Errormode not identifiable
12. Errormode not identifiable

Errordetection
Errorlamp shows permanent light. Entry in errormemory.

Possible reason for error
EDC16: main relay not open in allowed time or main relay open too early; EDC7: main relay not open in allowed time or short circuit of main relay to ground; EDC16: main relay defective, connection cable demaged; generally: rapid shut-off of the ECU (witho

Take actions for error repair
EDC16: check external main relay, check cabling
EDC7: if error is not removable, change ECU, EDC16: Check main relay and if necessary replace it, check connection cable and if necessary repair or replace it; both: if error is not removable, change ECU

other error properties
System reaction: Warning
Behaviour error lamp: permanent light
Selfhealing: no
Signal Priority: 3
Measurement @ errortime: actual value

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Pump	
Fault	**Possible cause**
Fluctuation of pressure/volumetric flow	■ Air intake ■ Internal leakage ■ Wear caused by dirt ■ Drive damage ■ With engine under load or temporary overloading disturbed control behaviour caused by contamination ■ Engine overload caused by power input on auxiliary drive ■ Governor oscillates
Hydraulic fluid too hot	■ Internal leakage ■ Wear damage

Leakage oil line	
Fault	**Possible cause**
Abnormal noises	■ Insufficient fastening
Hydraulic fluid too hot	■ High temperatures caused by high leakage indicate an expected failure of a component

Suction conditions	
Fault	**Possible cause**
Abnormal noises	■ Insufficient suction cross-section ■ Suction head too high ■ Redirections ■ Cross-section narrowing ■ Leaking suction line ■ Air bubbles ■ Tank shut-off valve not opened ■ Resistance on filter
No or insufficient volumetric flow	■ Suction behaviour disturbed ■ Insufficient suction cross-section ■ Suction head too high ■ Redirections ■ Cross-section narrowing ■ Leaking suction line

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Fault code	Description of fault	Remedy
056	Flame cut-off in control stage “LOW”	
060	Interruption - external temperature sensor not used by BOMAG.	
061	Short circuit - external temperature sensor connection not live on BOMAG.	
062	Control element - interruption	■ Pull the plug off the control element and measure the resistance of the nominal value potentiometer between (PIN 9 and PIN 6). If the resistance value is O.K. → Reconnect the plug. ■ Disconnect the plug-in connection from the AIRTRONIC and measure the resistance between (PIN 6 and PIN 7), if O.K. → Replace the control unit.
063	Control element - short circuit The fault detection only works in heater operation. However, if the short circuit is already present and the AIRTRONIC is switched on, “Ventilation” will be active (no fault code).	■ Disconnect the plug from the control element, if fault code 062 is displayed → Replace the control element. ■ If the control element is O.K. → check the connecting lines 0.5 gr/rt and 0.5 br/ws for short circuit, if O.K. → Reconnect the plug to the control element.
064	Flame sensor -interruption	■ Disassemble the control unit and pull the green plug off the control unit. Check the flame sensor, if O.K. → Replace the control unit.
065	Flame sensor - short circuit	■ Disassemble the control unit, pull the green plug off the control unit, if fault 064 is displayed → Replace the combined sensor. If fault 065 is still displayed → Replace the control unit.
071	Overheating sensor - interruption	■ Disassemble the control unit and pull the blue and green plugs off the control unit. Measure the resistance on the blue plug (PIN 1) and on the green plug (PIN 2), if O.K. → Replace the control unit.
072	Overheating sensor - short circuit	■ Disassemble the control unit, pull the blue plug off the control unit, if fault 071 is displayed → Replace the combined sensor. If fault 072 is still displayed → Replace the control unit.
090	Control unit defective (internal fault)	■ Replace the control unit.

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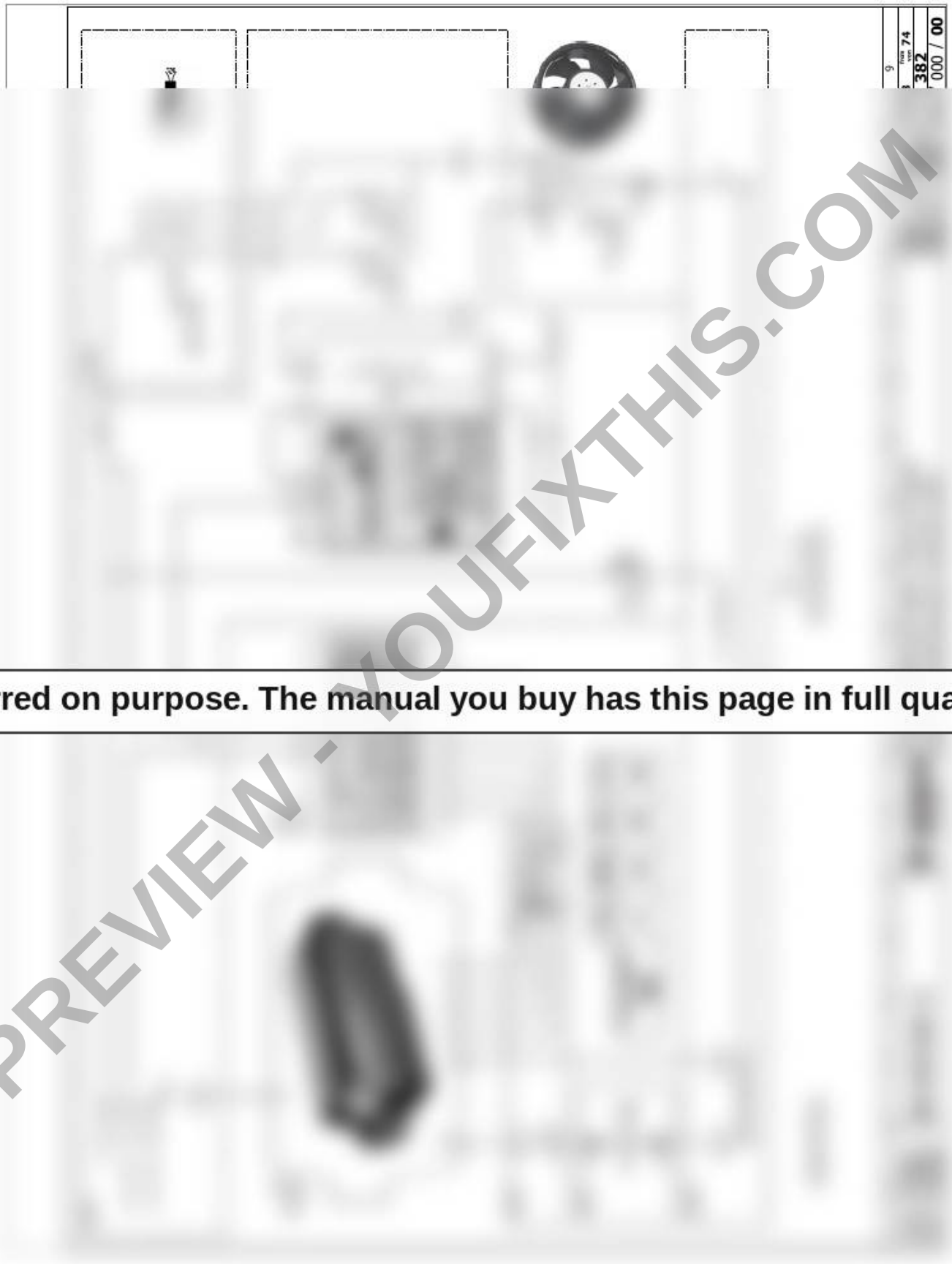
Circuit diagrams



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