Workshop Manual

FENDT 300 Vario COM III

FENDT 309 Vario COM III from Chassis-No: 336 .. 1001-
FENDT 310 Vario COM III from Chassis-No: 337 .. 1001-
FENDT 311 Vario COM III from Chassis-No: 338 .. 1001-
FENDT 312 Vario COM III from Chassis-No: 339 .. 1001-

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X990.005.056.010 - Englisch

FENDT Service-Training Dokumentation

Edition
10/2007

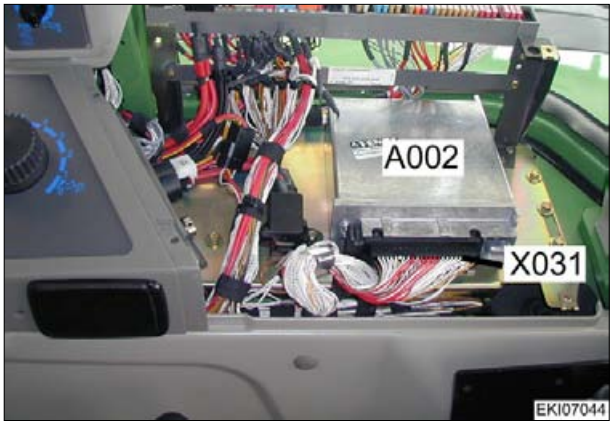
FENDT

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
00.0.01	A002	ECU, enhanced control	Bus error EDC/EMR, speed setpoint to EDC missing	Engine malfunction	El circuit diagram "Electronics voltage supply"	
00.0.04	A002	ECU, enhanced control	Bus error transmission, setpoint to actuator missing	No functions available, no display	El circuit diagram 'Electronics voltage supply'	
00.0.05	A002	ECU, enhanced control	Bus error 4WD/diff.	No functions available, no display	El circuit diagram 'Electronics voltage supply'	
00.0.06	A002	ECU, enhanced control	Bus error rear PTO	No functions available, no display	El circuit diagram 'Electronics voltage supply'	
00.0.07	A002	ECU, enhanced control	Bus error front PTO	Does not function, no display	El circuit diagram 'Electronics voltage supply'	
00.0.08	A024	ECU, EPC B	Bus error rear EPC	Does not function, no display	El circuit diagram "Electronic lifting gear control"	
00.0.15	A002	ECU, enhanced control	Bus error FA suspension	Does not function, no display	El circuit diagram 'Electronics voltage supply'	
00.0.16	A024	ECU, EPC B	Bus fault rear EPC automatic mode.	Does not function, no display	El circuit diagram 'Electronic lifting gear control'	
00.0.1E	A007	Instrument panel	Bus error output from EDC on instrument cluster	Does not function, no display	El circuit diagram 'Electronics voltage supply'	
00.1.4D	A007	Instrument cluster	Checksum menu icons (24x24), memory in instrument cluster faulty	Display error in instrument cluster		EOL programming
00.1.4E	A007	Instrument cluster	Checksum warning icons (64x64), memory in instrument cluster faulty	Display error in instrument cluster		EOL programming

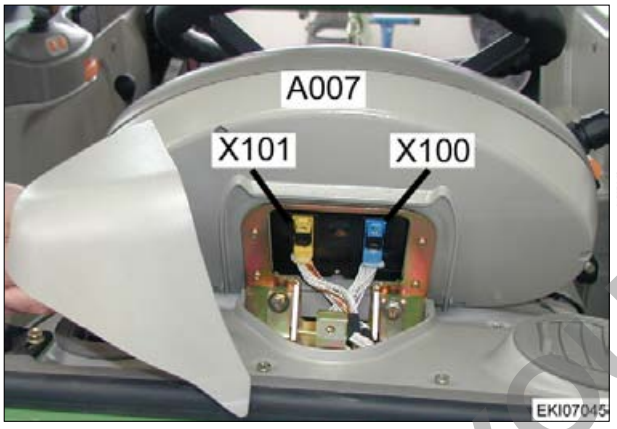
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Fendt 300 Vario	Tractor / General system **Electrical / electronic components - A**	**D**



A002 = ECU, enhanced control
X031 = Separation point on the ECU, enhanced control
In cab on right mudguard

Remove panel



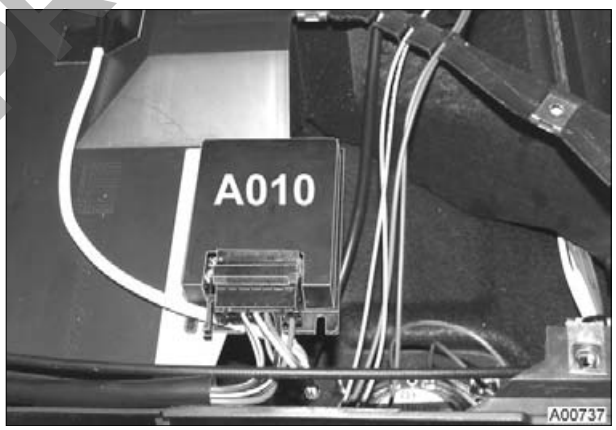
A007 = Instrument cluster
X100 = Separation point "blue"
X101 = Separation point "yellow"
on steering column unit

Remove rear panel



A009 = Actuator unit
X037 = Separation point on the actuator
On the right side of the transmission

Remove right rear wheel
Remove metal panel



A010 = Thermostat (air-conditioning)
In front of right B-pillar

Remove cab roof.

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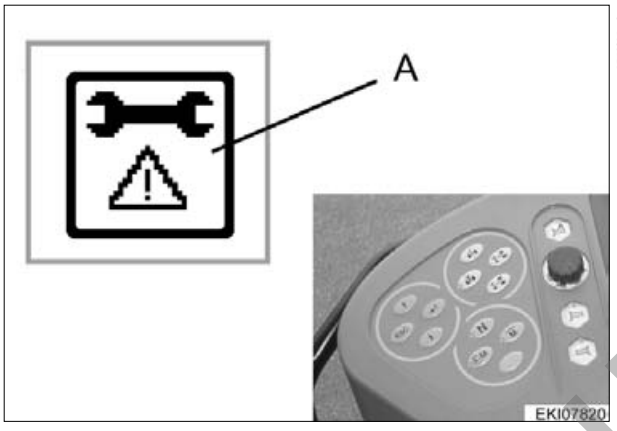
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Fendt 300 Vario	Tractor / General system **Calibration code 8001, 8002**	**F**

1. Calibration EPC - rear

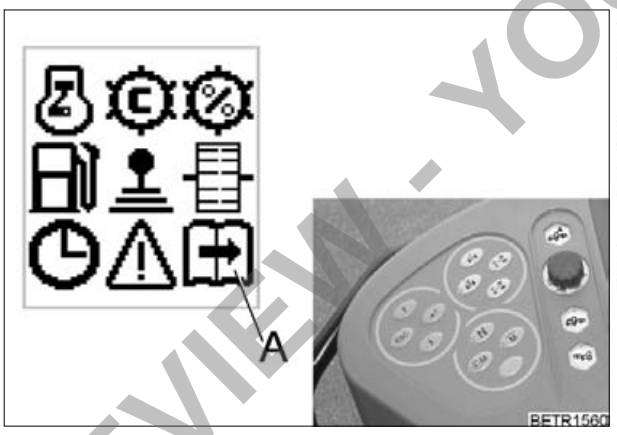
Calibration depth control (Code 8001)

Attention: the following preparatory steps must be carried out.
- Hand brake on
- Start engine
- If error messages are displayed, faults must be accepted individually



ESC

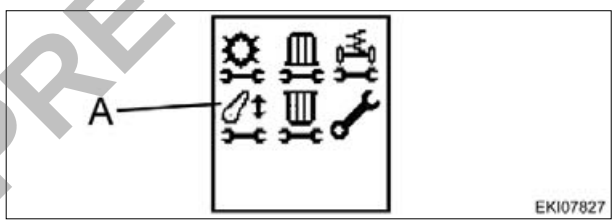
Accept warning and fault messages that are displayed on A007 - instrument cluster with the "ESC" key



Press key, the first main menu appears on the multiple display

Press either of the keys repeatedly until symbol (A) flashes

Press key, the second main menu level appears on the multiple display



The second main menu level appears on the multiple display

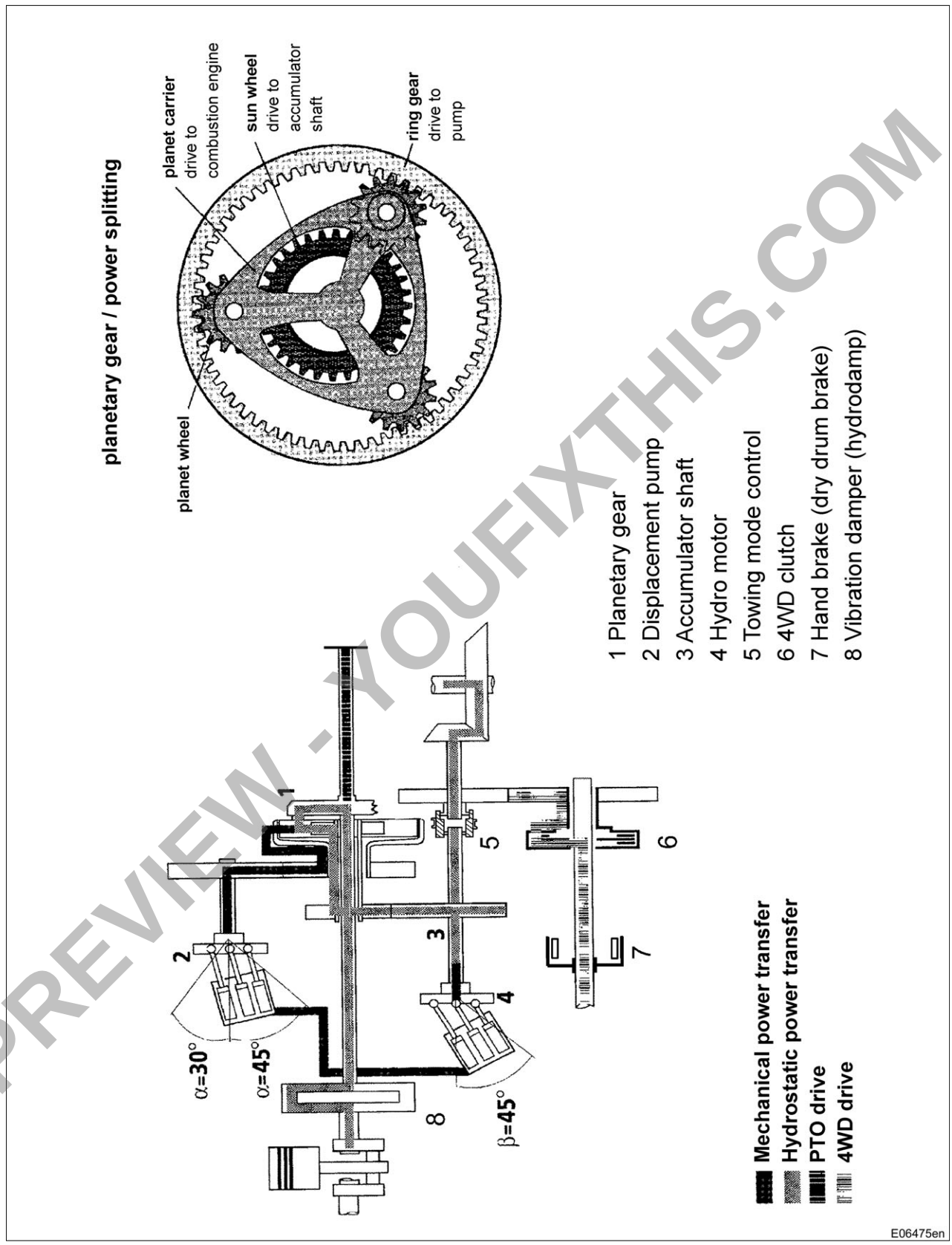
Press either of the keys repeatedly until symbol (A) flashes

Press the "Return" key

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Fendt 300 Vario	Transmission / transmission control unit **Functional schematic of transmission ML 75**	**A**



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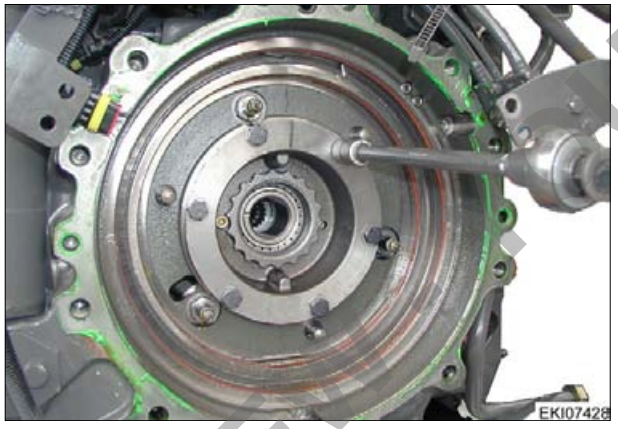
Fendt 300 Vario	Transmission / Differential **Pinion shaft, diff. gears and ring gear - removing and installing**	**G**

Preliminary work:

- Remove cab - see Chapter 8100 Reg.G
- Disconnecting tractor, transmission and rear axle housing - see Chapter 1050 Reg.G
- Removing live PTO speed preselection, see Chapter 1220 Reg. G
- Unflanging both axle drives and rear wheel brakes, see Chapter 1070 Reg. G
- Removing 4WD clutch, see Chapter 1320 Reg. G
- Removing PTO clutch, see Chapter 1220 Reg. G



Remove oil tray.



Unscrew all screws from left and right bearing flange.



Secure differential gears with piece of wood, press both bearing retainers outwards with a tyre lever and remove. Remove differential gears.

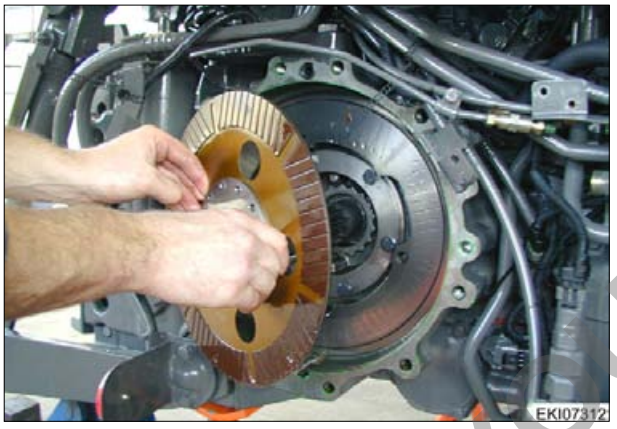
Note:
On the right bearing flange, look out for rectangular-section rings.

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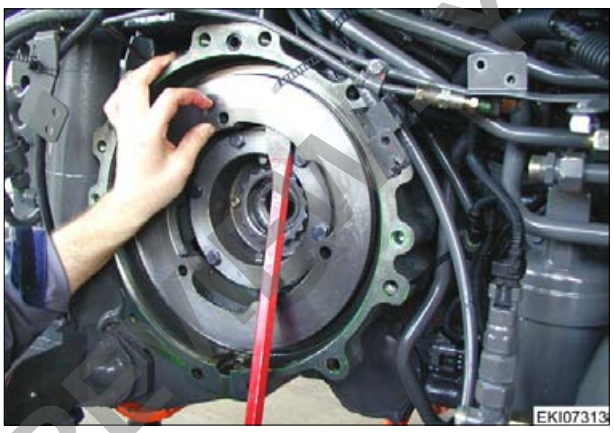
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Remove brake plate.



Remove brake pad disc and sun gear shaft.



Pry brake piston out using an assembly tool in the provided pockets.



Remove both O-rings.

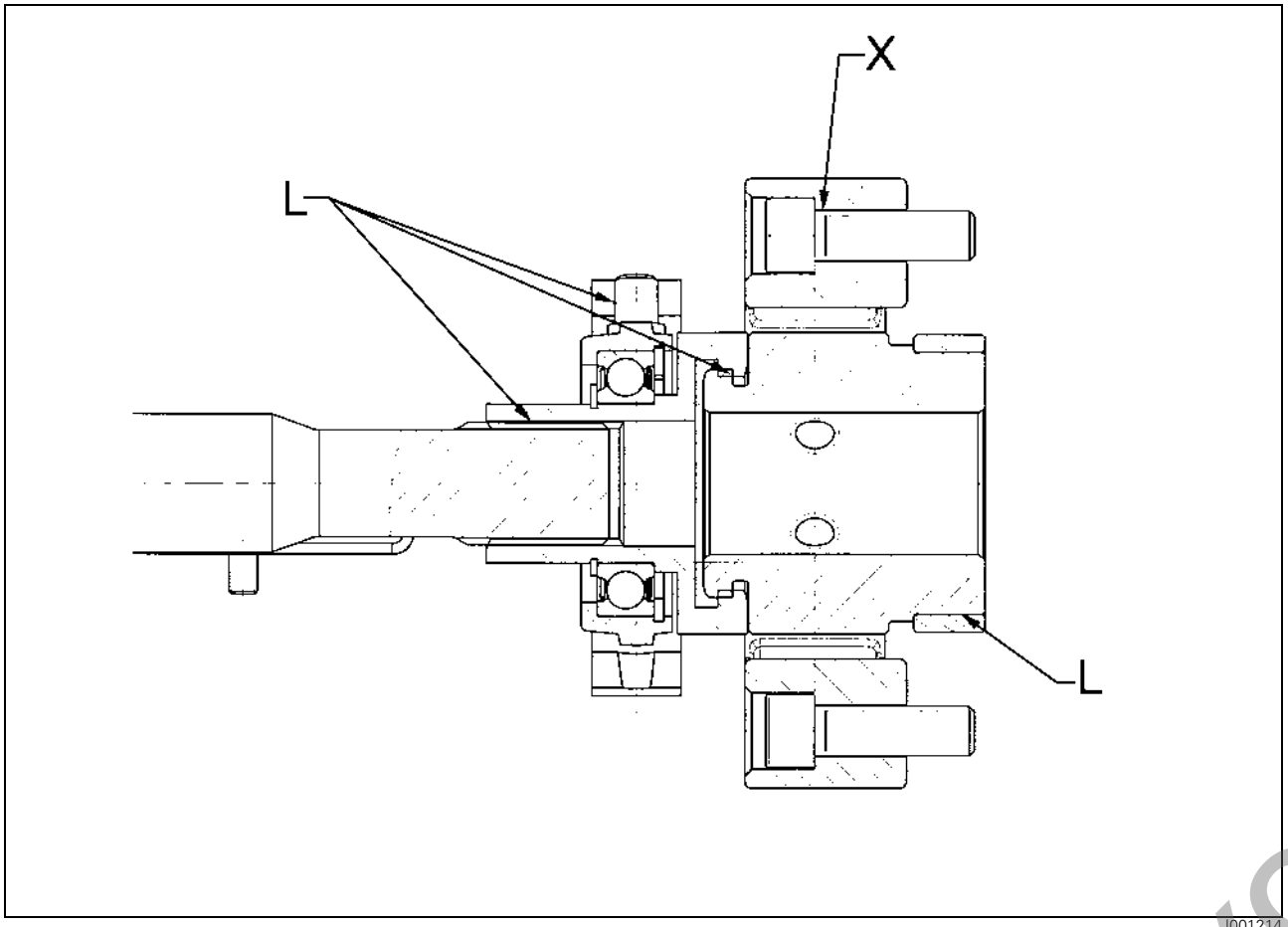
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FRONT PTO

Centaflex coupling

G

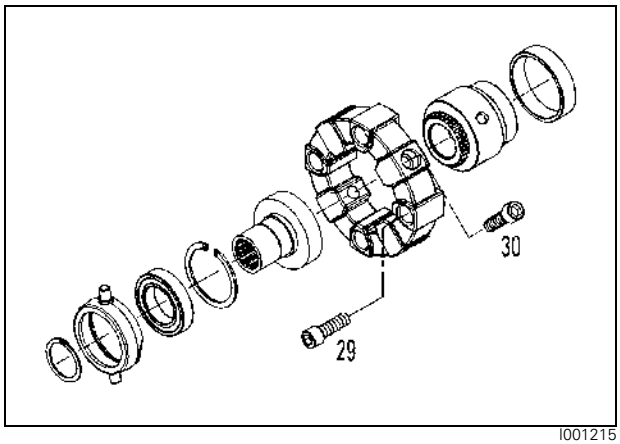


I001214

IMPORTANT:

Lubricate screw head seats (item X) of axial and radial screws to prevent the Centaflex clutch becoming deformed during tightening.

Avoid twisting (tilting) the rubber part when tightening.



I001215

Mounting sequence for axial and radial screws:

1. Tighten axial screws M14x50 (item 29) to 140 Nm.
2. Tighten radial screws M14x45 (item 30) to 140 Nm.

- Apply a thin coat of long-life grease to the teeth (item L).

Assembly Instructions

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Remove Hall sensor B015 ground speed.



Remove screw from flange



Pry off flange with assembly lever

Note:

Make sure that the 4WD clutch can slide out towards the front.



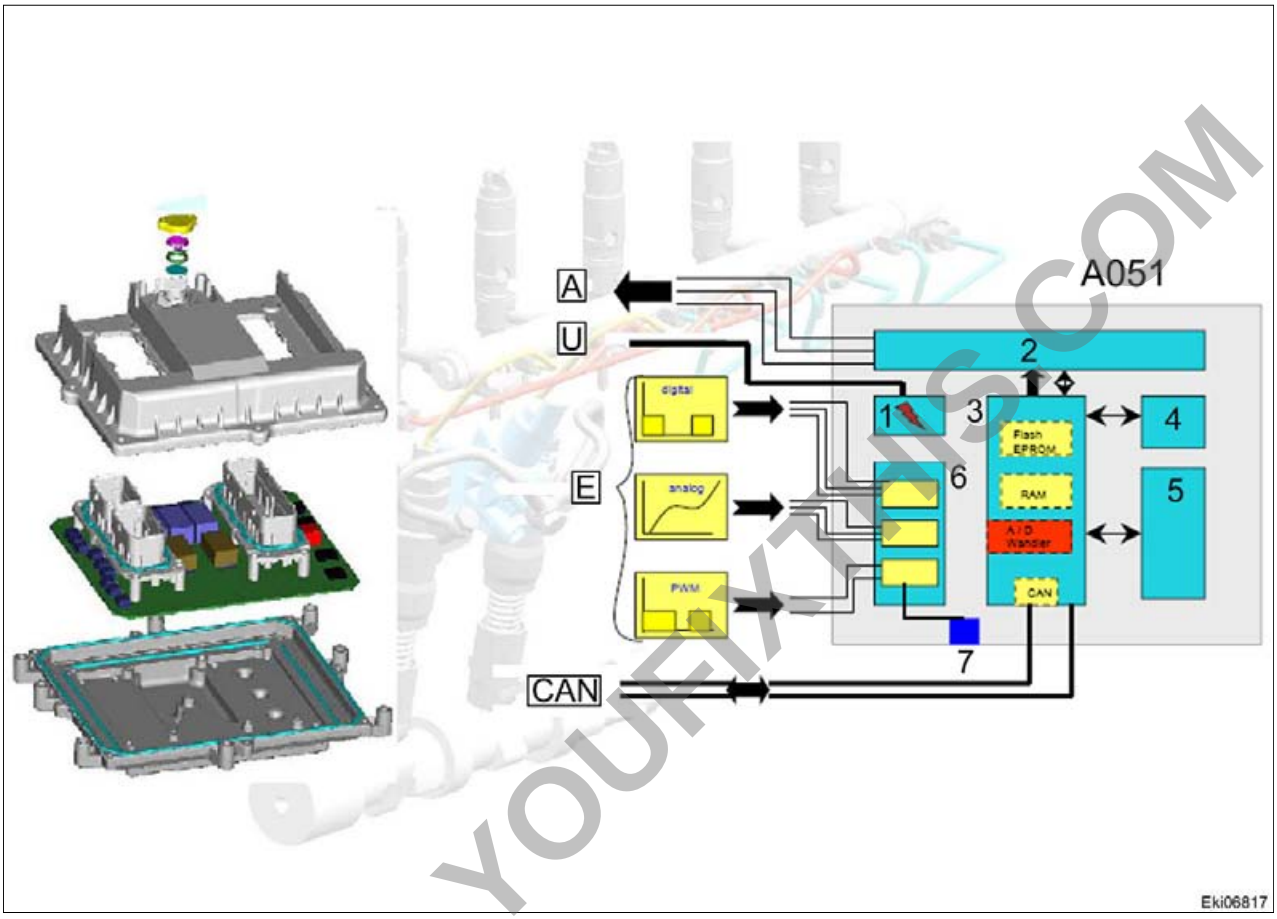
Remove 4WD clutch

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Fendt 300 Vario FENDT 400 COM III FENDT 7/800 COM III	Engine / General system **General description of the common rail system**	**A**

System overview



Item	Designation	Item	Designation
1	Voltage	A	Output signals (actuators)
2	Output stage	A051	ECU, engine control unit
3	Micro controller	CAN	CAN connection to tractor
4	EEPROM		or diagnostics interface
5	Monitoring module	E	Input signals (sensors)
6	Signal processing	U	Voltage
7	High pressure sensor		

The electronically controlled diesel injection (EDC) is divided into 3 central system blocks.

The **sensors** and **switches** (information providers, input) record the operating conditions on the engine and convert the various physical quantities into electronic signals.

In the **control unit** (processing), the information and output signals are processed according to the maps and characteristics that are stored. The control unit contains microprocessors and memory units. Integrated in the control unit are self-monitoring, emergency mode programs and on-board diagnositics.

The **actuators** (output) convert the electronic output signals into mechanical quantities.

Also required:

A good power supply is required for fault-free operation of the control unit.

This includes:

- Continuous current supply terminal 30
- Switched voltage terminal 15
- Ground supply terminal 31

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2250 ENGINE/ENGINE HEATER

Mounting engine heater and transmission oil heater

G

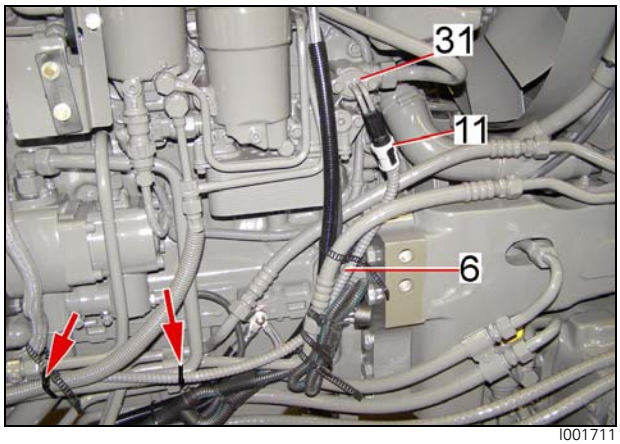
Preliminary work:

- Drain coolant.
- Drain transmission oil.
- Unscrew fuel tank.
- Raise rear of cab, if necessary.

Mounting engine oil heater:

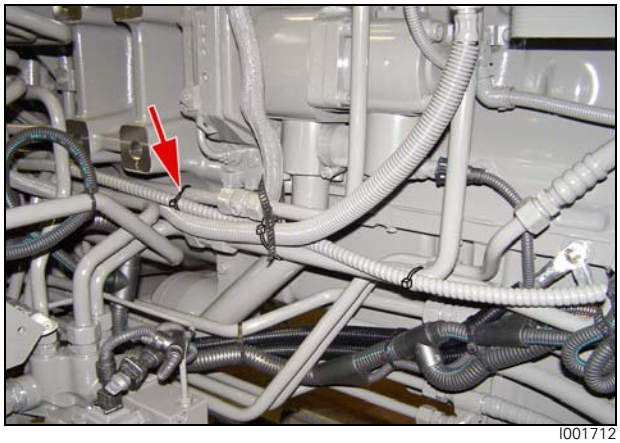
Engine oil heater components

Item	Designation	Item	Designation
1	BRACKET_SEPARATION POINT	51	HEX SCREW_M6X16-8.8-A3L
2	BRACKET_WIRING HARNESS	52	HEX SCREW_M6X40-8.8A3L
3	DISTRIBUTOR_Y-PIECE	53	HEX SCREW_M8X16-8.8-E3B
4	CIRCLIP	60	WASHER_DIN 125-5.3-ST.A3L
5	CONNECTION CABLE_0.5M	61	WASHER_DIN 125-6.4-ST.A3L
6	EXTENSION CABLE_2.0M	70	SPRING WASHER_-8-A3L
10	MOUNTING BRACKET	71	SPRING WASHER_-5-A3L
11	CIRCLIP	72	SPRING WASHER_B8
31	HEATING ELEMENT_ENGINE	80	HEX NUT_M5-8A3L
32	SUPPLY CABLE_POWER SUPPLY	81	HEX NUT_M6-8A3L
50	HEX SCREW_M5X16-8.8A3L	100	CABLE TAPE_B175X4-SW



I001711

- Unscrew blind flange and O-ring seal.
- Unscrew engine heater element (Item 31) and O-ring seal.
- Connect extension cable (Item 6) to the engine heater element with circlip (Item 11).
- Fasten extension cable to pressure pipe using 2x cable tie (arrowed).



I001712

- Lay the extension cable on the tractor frame towards the transmission and fasten to the pressure pipe using cable tie (arrowed).

Assembly Instructions

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Notes on installing an air conditioning system using PAG ND8 refrigerant oil and R134A coolant.

1. R134A coolant and PAG oil are extraordinarily hygroscopic, so contact with ambient air must be as short as possible.
2. After use, ensure that the refrigerant oil canister is sealed airtight.
3. Open up the air conditioning compressor just before fitting the pipe group to the connecting piece, to prevent ingress of moisture.
4. Do not use any mineral refrigerant oils in R134A air conditioning systems.
5. Do not use parts or material from R12 air conditioning systems in R134A air conditioning systems.
6. Use only the Air-Conditioning Service Station for R134A coolant.
7. To avoid contact with mineral refrigerant oils, keep R12 and R134A tools separate.
8. When handling refrigerant oil, observe disposal and other regulations in force.
9. When fitting, oil all O-rings with PAG ND8 refrigerant oil.

Environmental and safety notes:
All work on refrigerant circuits must be carried out by specialists from authorised workshops only. Under no circumstances may the coolant escape into the free air (German Statute Book §. 8, CFC - Halon legislation, 06.09.1991)

NOTE:
For operation and maintenance, see operating manual.

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Fendt 300 Vario	Cab / General system **Remove cab**	G

Equipment required:

- Hoist (cab approx. 700 kg)
- Hoisting yoke (DIY, see Chapter 9920 Reg. A)
- Trestles (800 kg)



Preliminary work:

Lower rear power lift.

Prop tractor, taking appropriate safety precautions, and remove both rear wheels.



Remove side panel and drain coolant.

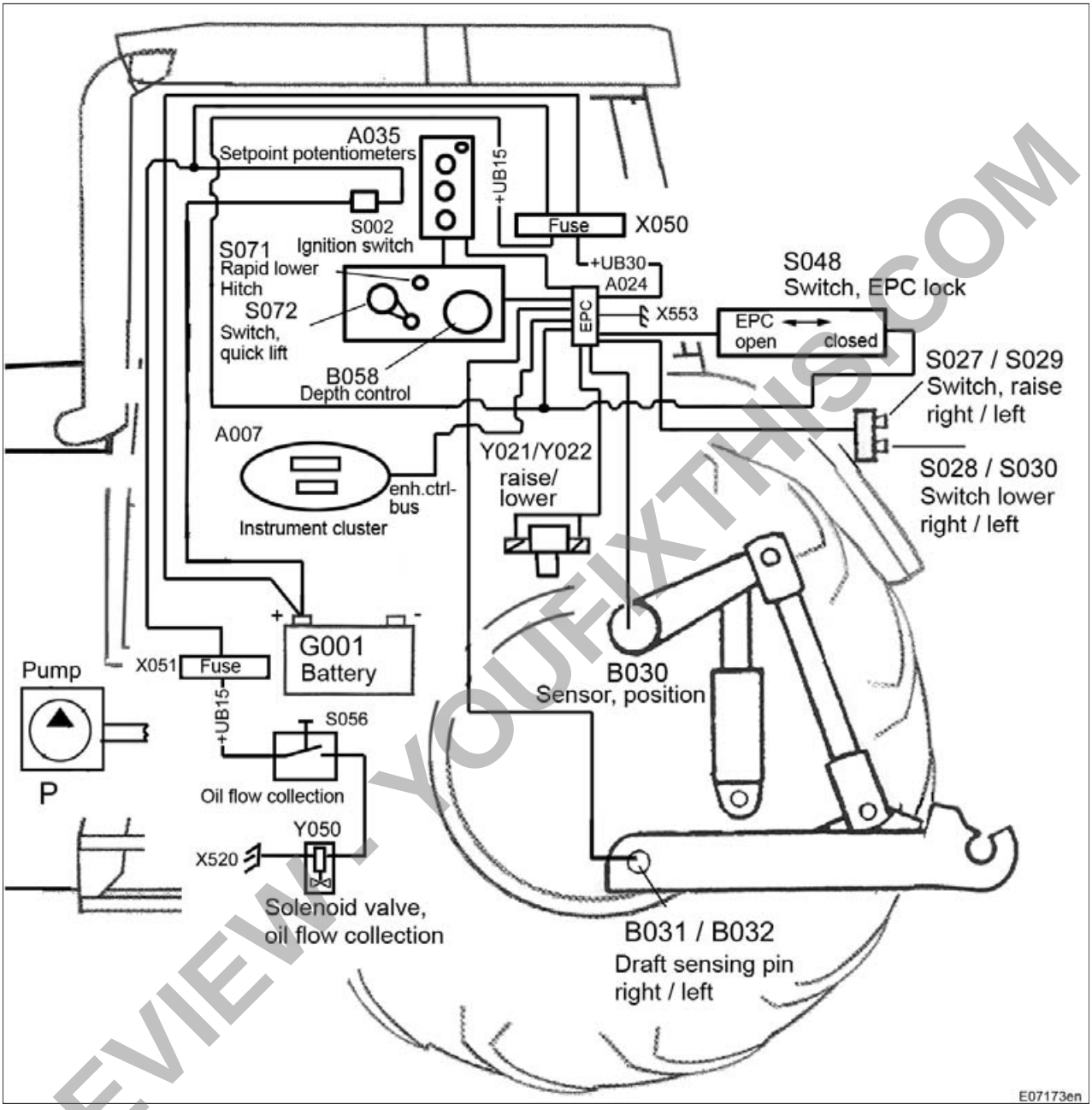


Remove battery cover.

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Fendt 300 Vario	Power lift / Electrohydraulic control EPC **EPC - rear power lift**	**A**



Item	Designation	Item	Designation
A007	Instrument cluster	S030	External switch lower, left
A024	ECU, EPC B	S048	Switch EPC lock
A035	EPC control panel (potentiometer set-point)	S056	Switch, oil flow collector
B030	Sensor, position	S071	Switch, rapid lowering / hitch
B031	Draft sensing pin right	S072	Switch, quick lift
B032	Draft sensing pin, left	X050	Fuse holder 1 compl
B058	Depth control	X051	Fuse holder 2 compl
G001	Battery (12 VDC)	X520	Ground
K-bus	Enhanced control bus	X553	Ground
S002	Ignition switch	Y021	Solenoid valve, rear power lift raise
S027	External switch 'raise', right	Y022	Solenoid valve, rear power lift lower

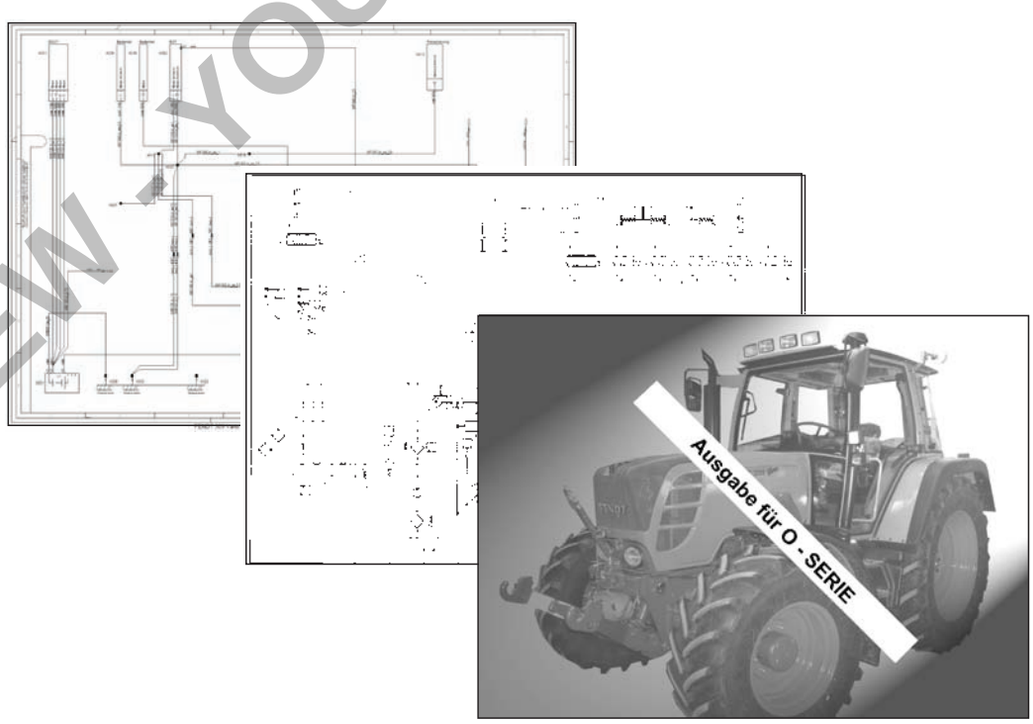
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Service Training

Electrical and hydraulic diagrams

FENDT 300 Vario

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FENDT 310 Vario from .. / 0101 - to .. / 1000
FENDT 311 Vario from .. / 0101 - to .. / 1000
FENDT 312 Vario from .. / 0101 - to .. / 1000



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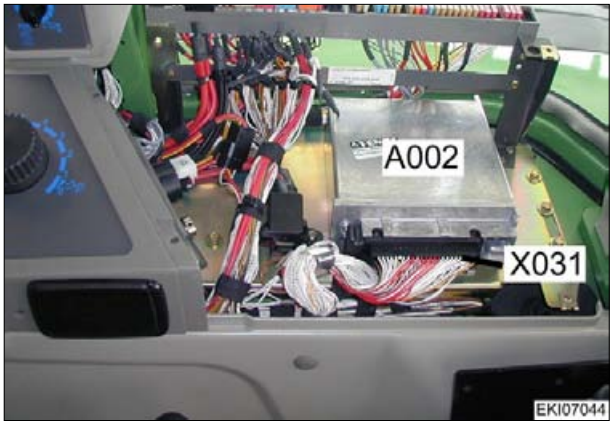
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Fendt 300 Vario	Electrics / General system **A002 - ECU, enhanced control**	**E**

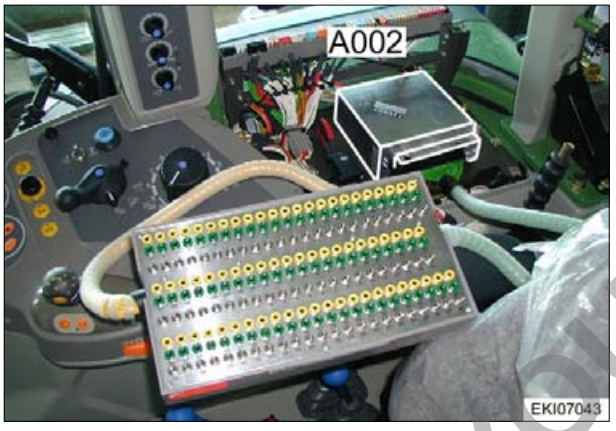


A002 = ECU, enhanced control

X031 = Separation point at A002 - ECU, enhanced control

In cab on right mudguard

Remove panel



Connect e - adapter box X899.980.208.100 directly to the A002 - ECU, enhanced control

Measuring the supply voltage for the A002 - ECU, enhanced control

+ UB 30 (battery voltage)				
Test	**Pin**	**Specified value**	**Condition**	**Possible cause of fault**
+ supply	54	approx. 12.0 VDC	Engine off	Fuse (F041) in X051 or in wiring See also Electronics power supply circuit diagram
		approx. 14 VDC	Engine running	
Ground Electronic	55			
+ supply	54	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).
Ground Electronic	55			

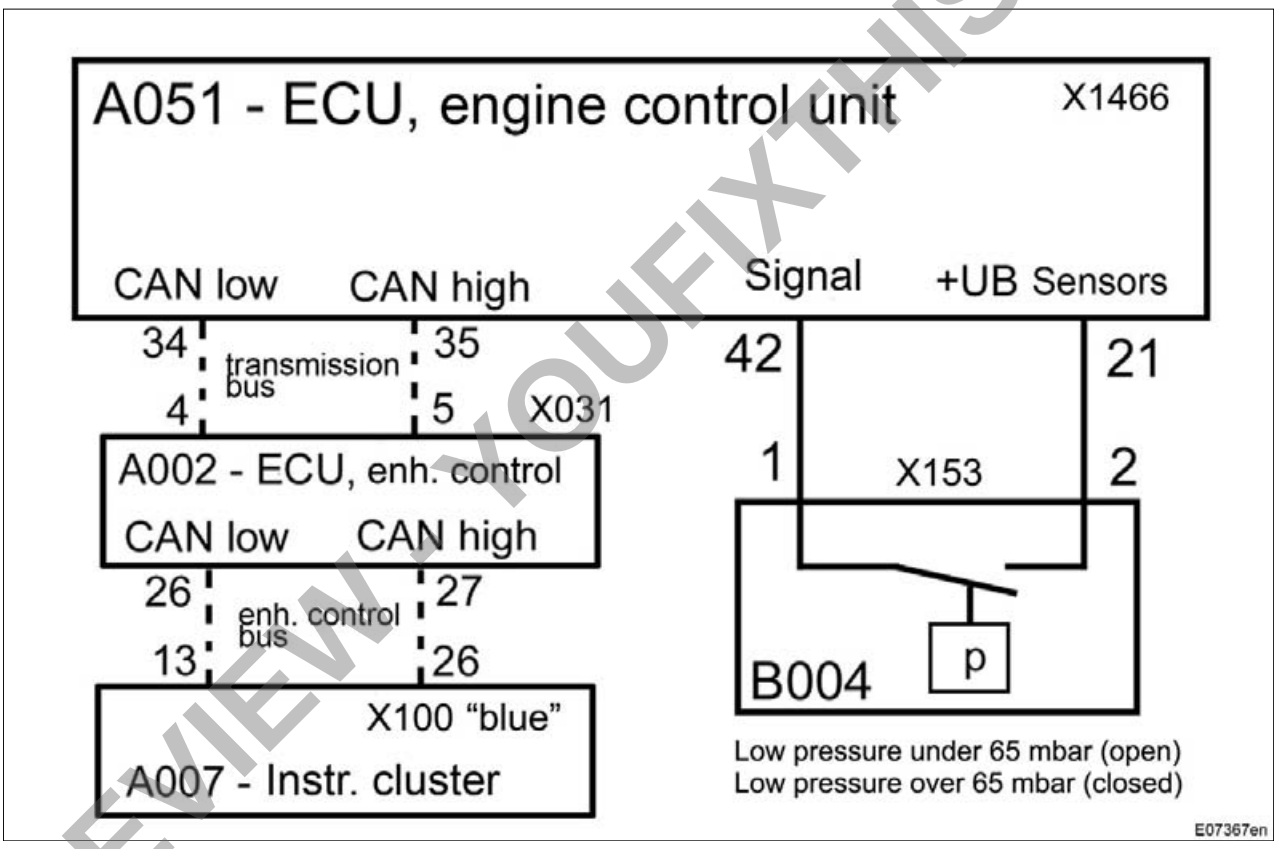
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Fendt 300 Vario	Electrics / General system **B004 - underpressure switch**	**E**



B004 = Sensor, underpressure
X153 = Separation point on B004
On air filter

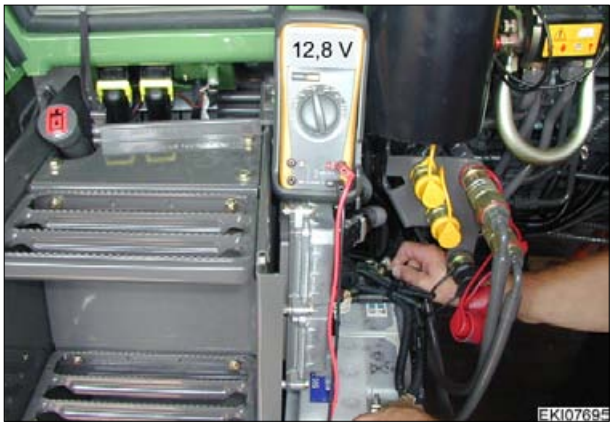


Item	Designation	Remark
A002	ECU, enhanced control	
X031	Separation point on A002	
Pin 4	Transmission BUS (CAN low)	
Pin 5	Transmission BUS (CAN high)	
Pin 26	Enhanced control BUS (CAN low)	
Pin 27	Enhanced control BUS (CAN high)	
A007	Instrument cluster	

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Fendt 300 Vario	Electrics / General system **G001 - battery**	**E**

Note:
Check battery charge with aid of open-circuit voltage.
Test conditions: ambient temperature approx. 27°C



For six hours before test do not charge battery or connect to consumer. Disconnect ground cable from battery.

Connect multimeter (voltmeter).

Target values at 27°C:

12.8 VDC = **full**

12.1 VDC to 12.25 VDC = **1/2**

11.4 VDC to 11.8 VDC = **empty**



Complaint: battery discharges without consumers being switched on.

Check discharge current using multimeter (ammeter).

Switch off all consumers. Disconnect battery's ground cable, and connect multimeter (ammeter) in series.

Consumption

when ignition ON = approx. 3.50 ADC

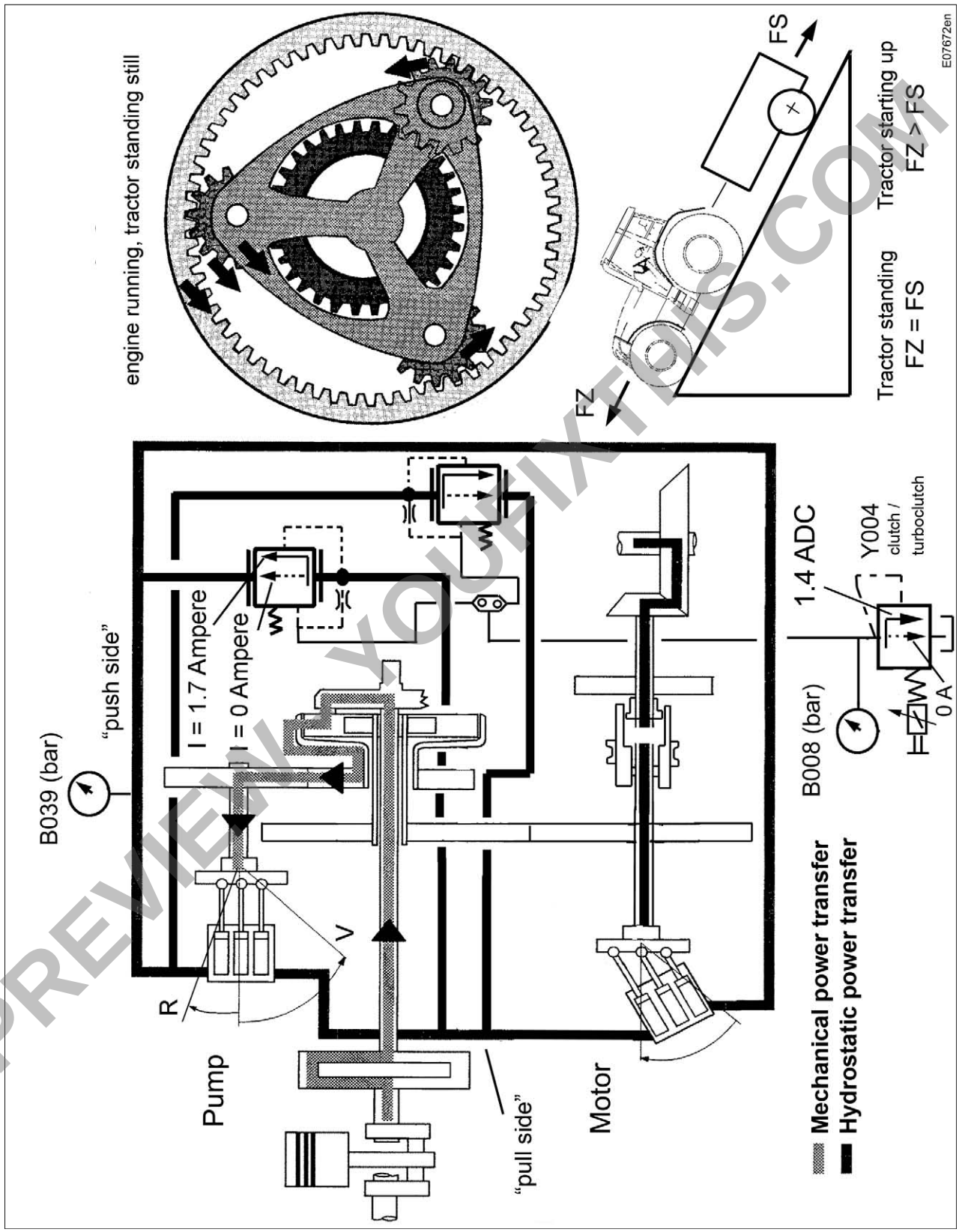
when ignition is OFF and K064 - battery disconnect relay is engaged = approx. 3 mADC

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Fendt 300 Vario	Electrics / General system **Y004 - solenoid valve, clutch / turboclutch**	**E**

Function: Y004 - solenoid valve, clutch / turboclutch



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ELECTRICAL SYSTEM/STARTER LOCKOUT

Mounting battery disconnector

G



I001775

- Unscrew radio trim from inside cab roof and swivel downwards.
- Remove trim (arrowed).
- Pull separation point (X1645) forwards.



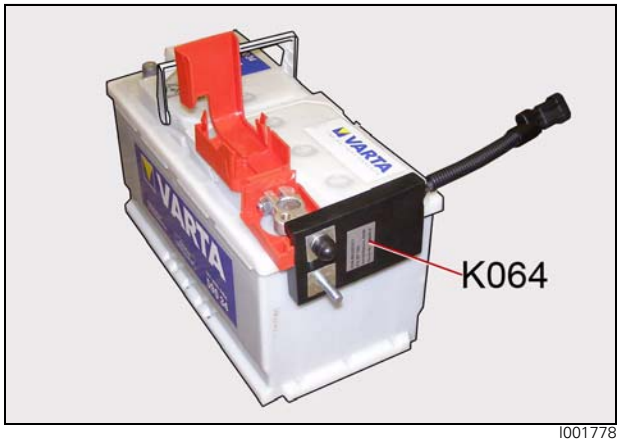
I001776

- Clip insert (Pos. 16) into toggle switch (Item 28).
- Insert toggle switch (Item 28 / S083) into radio trim.
- Attach separation point (X1645) to toggle switch.
- Re-mount radio trim.
- Attach decal (Item 14) below toggle switch.



I001777

- Remove trim from battery
- Remove dummy plug from separation (X1699) point.
- Unscrew cables from positive and negative terminals.



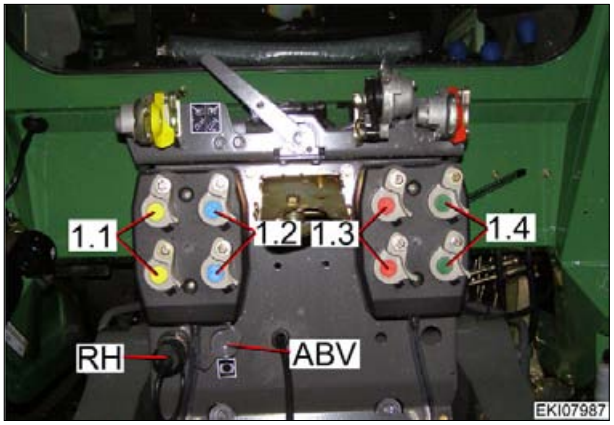
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- Screw on battery disconnect relay (K064) to positive battery terminal.

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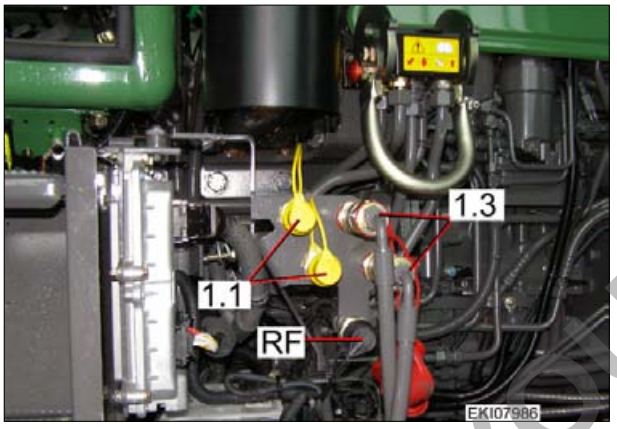
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Fendt 300 Vario	Hydraulics / General system **Technical specifications: service and steering hydraulics**	**A**



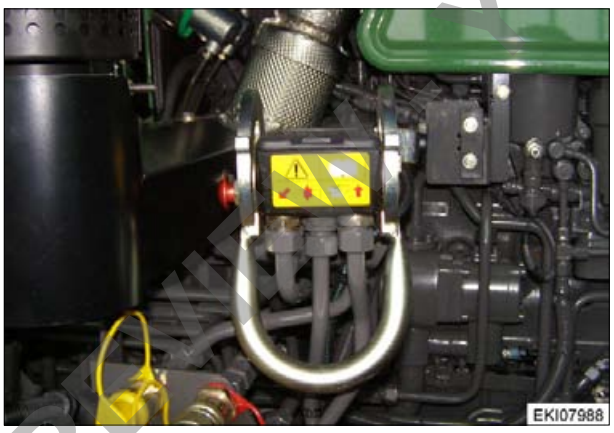
Hydraulic connections, rear

1.1 = Valve, yellow
1.2 = Valve, blue
1.3 = Valve, red (optional extra)
1.4 = Valve, green (optional extra)
RH = Return flow rear
ABV = hydraulic trailer brake valve (optional extra)



Centre hydraulic connections

1.1 = Valve, yellow
1.3 = Valve, red
RF = Return flow front



Multi-coupling (optional extra)

- Valves, yellow and blue as well as front return flow

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Retrofitting Tractor Management System (TMS) and 4WD/differential lock auto mode system

Retrofit kit: Tractor Management System (TMS) and 4WD/differential lock auto mode system

NOTE:
The Tractor Management System (TMS) and 4WD/differential lock auto mode system are retrofitted and programmed as part of a package



I002423

Contents: retrofit kit		
Designation	**Spare part number**	**Note**
Installation kit for seat switch	F718.500.030.090	Seat switch, rocker Various installation items
B008 high-pressure sensor (transmission)	G718.970.020.021	-
B039 high-pressure sensor (push/pull detection)	G718.970.020.021	-
TMS label	725.500.020.840	-
End-of-line program EOL 7.60 or above	-	Notes on programming: – Tractor Management System (TMS) – 4WD/differential lock auto mode system
Operating manual FENDT 300 Vario	339.000.000.003 de 339.000.000.013 en 339.000.000.023 fr 339.000.000.033 it 339.000.000.043 es 339.000.000.063 nl	only in modification kit de U339.970.110 only in modification kit en U339.970.120 only in modification kit fr U339.970.130 only in modification kit it U339.970.140 only in modification kit es U339.970.150 only in modification kit nl U339.970.160

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All types	Tractor / General system **Assembly overview**	**A**

3000	**Front axle**
3010	Front axle support
3020	Axle housing
3050	Suspension
3060	Suspension valve fitting
3070	Suspension pipe
3100	Track rod
3120	Steering cylinder
3170	Frame
3180	Cardan shaft
3190	Diff. lock actuation system

4000	**Steering**
4070	Steering wheel
4090	Hydraulic steering assembly

5000	**Vehicle body**
5010	Design
5030	Driver seat
5050	Trailer hitch
5161	Trailer hitch coupling
5200	Cab mount, suspension

5500	**Air conditioning system**
5520	Compressor drive
5530	Coolant lines
5550	Evaporator
5560	Condenser
5570	Electrical cables

8100	**Cab**
8113	Heater
8114	Ventilation
8117	Windscreen wipers
8121	Cable loom

8600	**Power lift**
8610	Electrohydraulic EPC control
8618	External control
8631	Control lifting gear

8700	**Three-point hitch**
8730	Lift arms
8740	Support

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Unscrew both rear cab bearings.



Carefully lift cab and ensure that all components have adequate clearance, be particularly careful that the steering servo unit does not slide out of the cab.



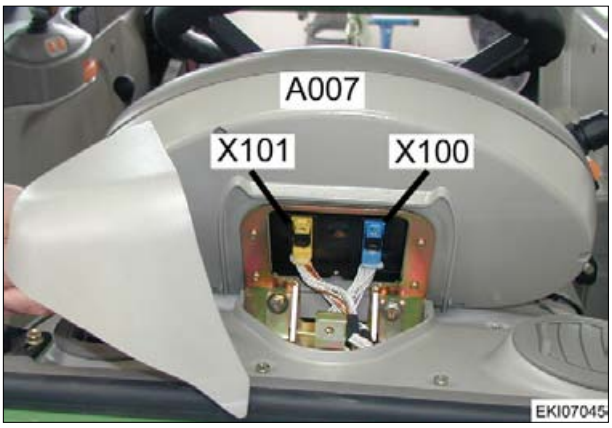
Raised cab.

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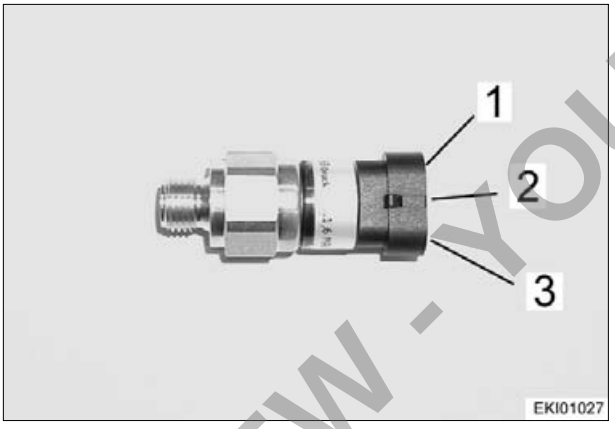
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Fendt 300 Vario	Electrics / General system **B019 - Sensor, compressed air volume**	**E**

Item	Designation	Remark
Pin 2	Signal	
Pin 3	+ Supply (12 VDC)	
X503	Grounding point	



A007 - instrument cluster (X101 - separation point 'yellow')	
Pin	**Function**
24	Signal
20	Ground



B019 - sensor (X168-separation point)	
Pin	**Function**
1	Ground
2	Signal
3	+ supply

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