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

8800	**Compressed air system**
8810	Compressor
8820	Brake fittings
8830	Lines
8850	Electrical actuation system
8890	Air tank

8900	**Front loader**
8910	Mounting frame
8915	Hydraulic implement actuation system
8955	3. hydraulic circuit
8958	Multi-coupling
8970	Pipes
8990	Lift cylinder

9000	**Electrics**
9010	Alternator
9015	Starter lockout
9040	Fuses
9050	Battery system
9060	Starter motor system

9200	**Front power lift**
9210	Lift gear
9211	External control
9220	Cylinder
9230	Pipes
9260	Enhanced control power lift
9280	Frame

9400	**Hydraulic pump assembly**
9410	LS pump
9420	Transmission pump
9430	Steering pump

9500	**Hydraulic pipes**
9510	Base circle
9516	Power lift
9525	with oil cooler
9530	Hydraulic trailer brake
9531	Steering
9534	Reversing system

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
4.1.20	A002, A034	ECU, enhanced control Joystick	Accelerator pedal release pot. ('Slide switch') not calibrated or EEPROM checksum error	Driving in accelerator pedal mode not possible		JOYSTICK, CAN - JOYSTICK calibration code" 4010"
4.1.21	S045	'Reverse operation sensor' solenoid switch	Signal fault			TRANSMISSION, FUNCTION OVERVIEW
4.1.22	A034	Joystick	Accelerator pedal release pot. ('Slide switch') faulty	Accelerator pedal mode not functioning		JOYSTICK, CAN - JOYSTICK
4.1.23	A003, A034	Joystick 'cruise control ON'	Signal fault	Continuation in emergency mode possible	'Transmission control' circuit diagram	TRANSMISSION, CRUISE CONTROL
4.1.24	S015	Hand brake solenoid switch	Signal fault	Hand brake automatic mode not available	'Transmission control' circuit diagram	TRANSMISSION, OPERATING RANGE
4.1.25	A003, A034	Joystick 'Rapid reversing'	Signal fault	Continuation in emergency mode possible	'Transmission control' circuit diagram	TRANSMISSION manu. adjustment
4.1.26	A034	Joystick	Joystick signal 'accelerator pedal mode' faulty	Accelerator pedal mode not functioning		JOYSTICK, CAN - JOYSTICK
4.1.27	A034	Joystick	Rapid reverse button (F/R rocker) fault	F/R rocker in the armrest not functioning	(joystick lock)	JOYSTICK, CAN - JOYSTICK
4.1.28	A009	Transmission control unit, F/R incremental encoder	Signal fault	Continuation in emergency mode possible	'Transmission control' circuit diagram	TRANSMISSION, TRANSMISSION CONTROL
4.1.29	A003, A034	Joystick 'Rest position'	Signal fault	Continuation in emergency mode possible	'Transmission control' circuit diagram	TRANSMISSION manu. adjustment
4.1.2A	B015	Bevel pinion direction (=direction of travel) Hall sensor	Signal fault	Continuation in emergency mode possible	'Transmission control' circuit diagram	TRANSMISSION, CRUISE CONTROL

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FEHL27

49. Load-sensing pin (left or right) overloaded

Remove load from load-sensing pin left or right.


FEHL39

50. Seat switch defective

If the tractor is in accelerator mode, the direction of travel must be activated again while stationary and engine running.
No playback of the Variotronic Ti functions.



FEHL40

51. Fault in the Variotronic Ti

One or more functions defective.
Read error memory on A007 - instrument cluster

No playback of the Variotronic Ti functions.


FEHL41

52. Playback function

When activating the playback function, one or more functions faulty.
Restart tractor, if the fault message is still present

Reprogram A002 - ECU, enhanced control (EOT)

See also Chapter 9700 Reg. A - functional description Variotronic Ti ('Teach In')



FEHL42

53. Fault in the Tractor Management System

Reduced operation
Reprogram A002 - ECU, enhanced control (EOT)

See also Chapter 2710 Reg. A - EMR / TMS speed adjustment



FEHL46

54. Fault in the automatic function PTO-lifting gear

Reprogram A002 - ECU, enhanced control (EOT)
Reprogram A004 - control console (EOT)


FEHL70

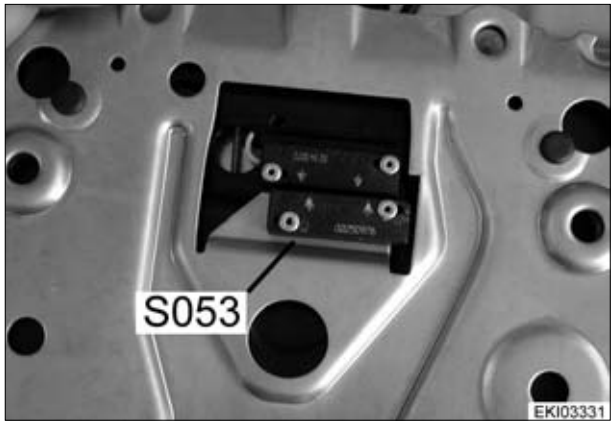
55. Activating button is pressed or stuck when tractor is started up.

Release activating button.

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FENDT 700 Vario FENDT 800 Vario	Tractor / General system **Electrical / electronic components - S**	**D**



S053 = Seat switch
On the driver's seat

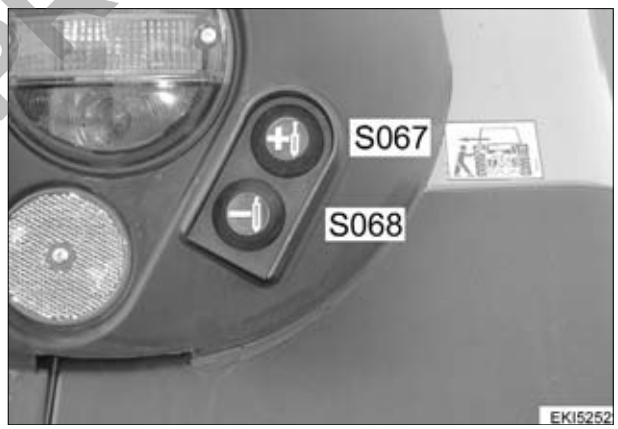
Remove upholstery



S061 = Rapid reversing switch
On the steering wheel stalk



S062 = Switch, hydraulic brake
(trailer brake optional extra)
On left of instrument cluster by steering wheel

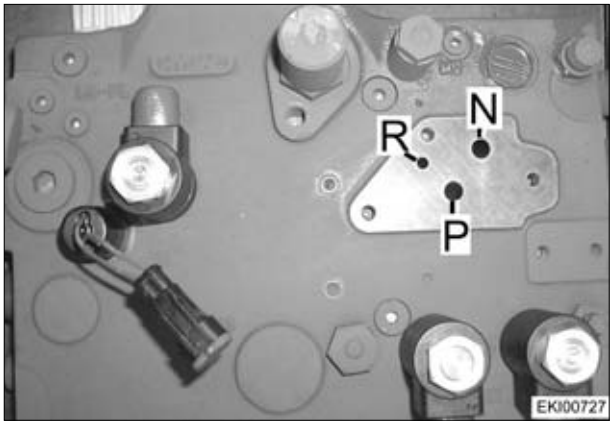


S067 = Pushbutton external valve actuation - raise
S068 = Pushbutton external valve actuation - lower
on left rear mudguard

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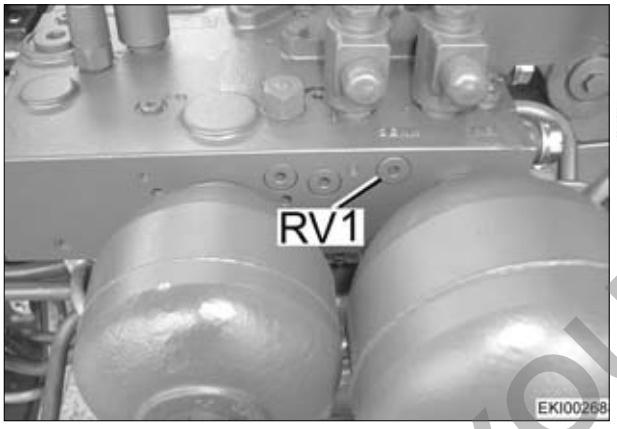
FENDT 700 Vario *FENDT 800 Vario*	Tractor / General system **Hydraulic components**	**D**



R on ABV = Return flow connection for hydraulic trailer brake (ABV)

On top of ZSB

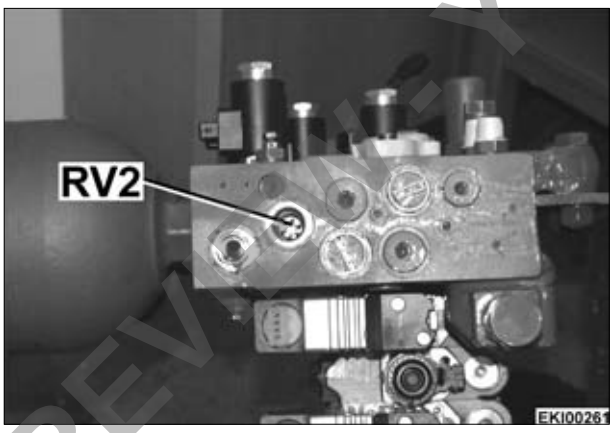
Remove panels



RV1 = Non-return valve no. 1
= In suspension system

Interior of ZSB (viewed from frame)

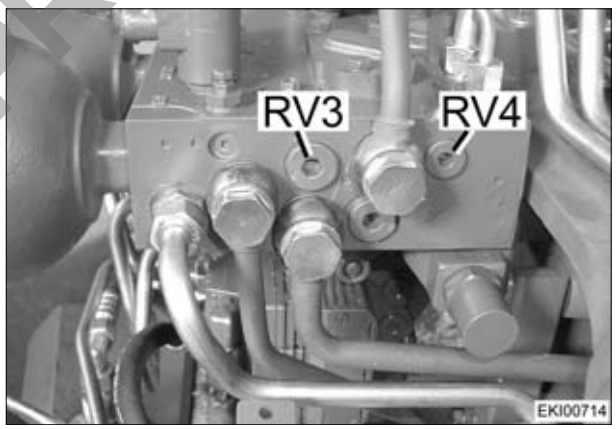
Remove panels



RV2 = Non-return valve no. 2
= Lower suspension in connection bore 'B'

On right side of ZSB

Remove panels



RV3 = Non-return valve no. 3
RV4 = Non-return valve no. 4
= RV3 and RV4 separate the auxiliary pump and LS pump from each other.

On left side of ZSB

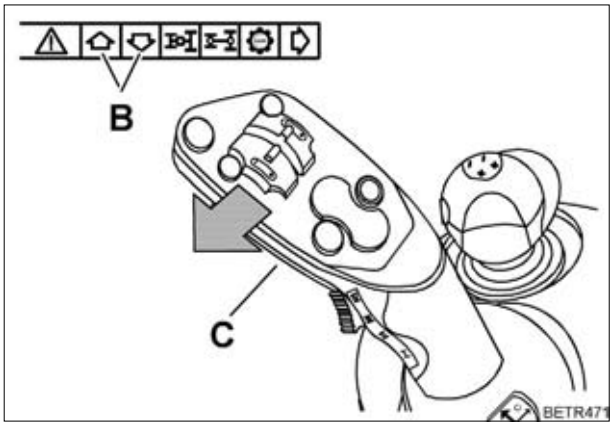
Remove panels

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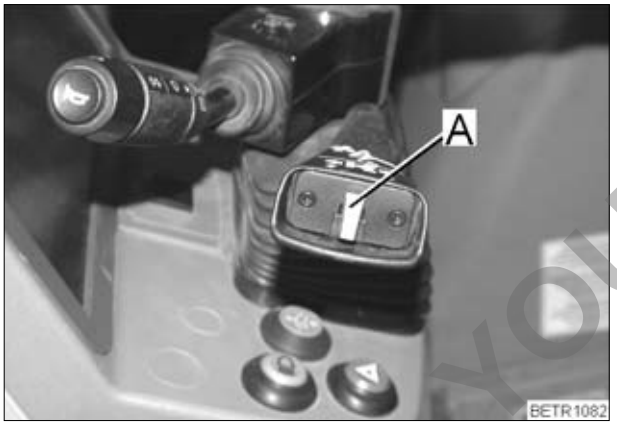
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FENDT 700 Vario FENDT 800 Vario FENDT 900 Vario	Transmission / General system **Description draft control**	**A**

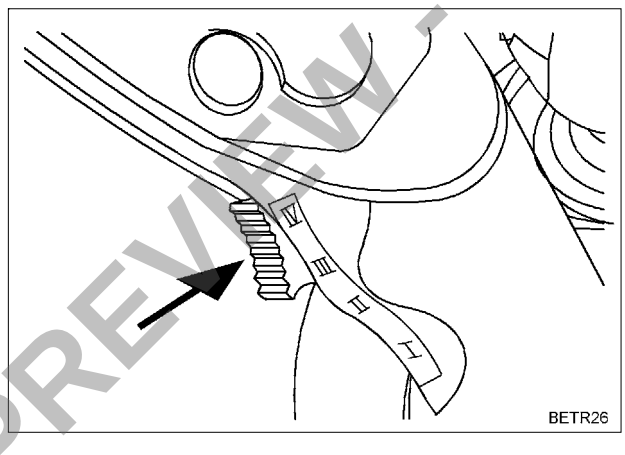
During rapid reversing in 'push' operation
('push' operation = both B008 and B039 detect transmission oil pressure)



- rapid reversing on the A034 - joystick



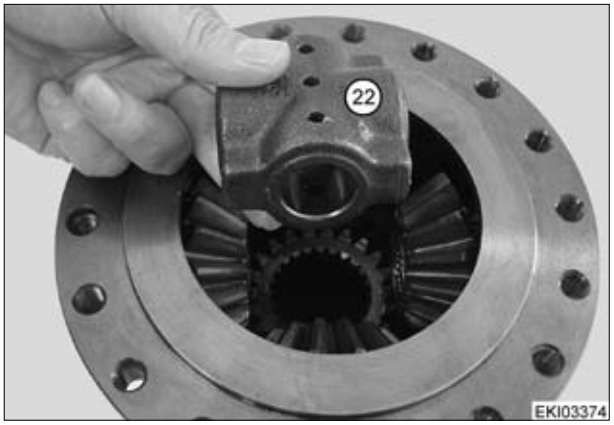
rapid reversing on the S001 - steering column switch



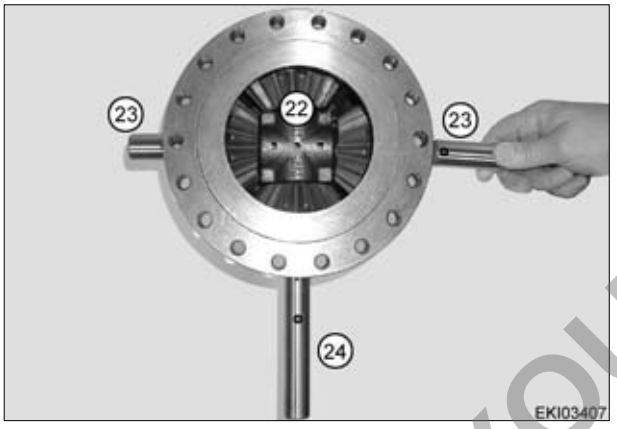
Acceleration		
Note: the values depend on the tractor power output !		
Stage:	**1x touch**	**0 to 50 kph**
I	0.02 - 0.5 kph	250-45.5 sec
II	0.5 kph	45.5 secs
III.	1.0 kph	23.8 secs
IV	2.0 kph	10 secs

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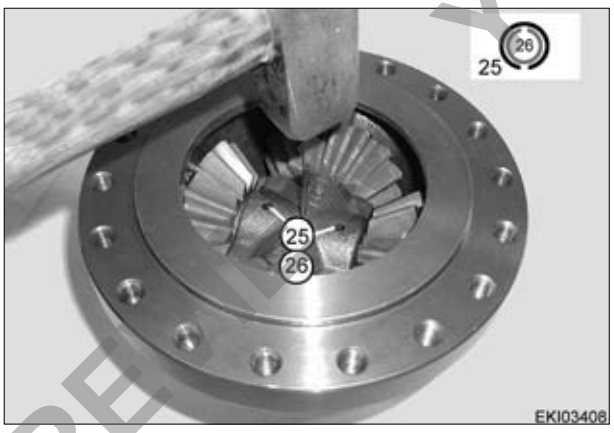
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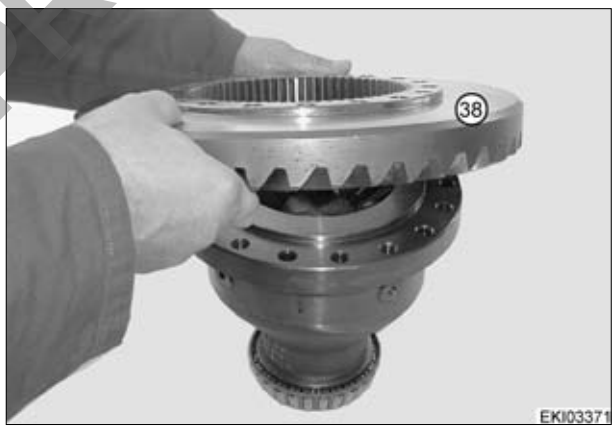
Fit support (22).



Fit axles (23, 24), ensure proper position of the bores for the dowel pins.



Drive in dowel pins (25, 26), ensure the slits are offset (see picture).

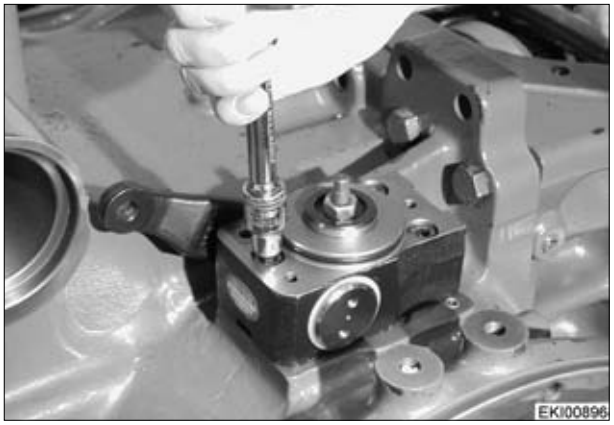


Fit ring gear (38).

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Fav 700 *FENDT 700 Vario* *FENDT 800 Vario*	Transmission / brake system **Installing and removing brake cylinders**	**G**



Loosen hexagon nut (43) and screw in the setscrew (42).

Mount the cylinder lower part (39), inserting sprag (44).

Tighten M8 socket head cap screws crosswise to **69** Nm.

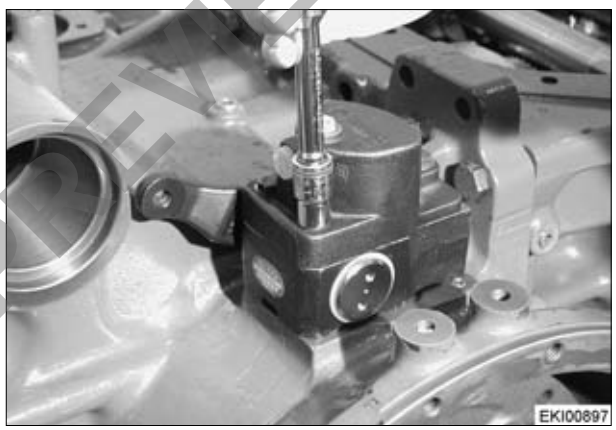


- Tighten setscrew (42) to a tightening torque of **4.0 to 5.0 Nm (rear wheel locks)** using torque gauge X899.980.151.
- Loosen setscrew (42) by **1.5 turns (rear wheel turns)** and lock with nut
- Tighten hexagon nut (43) to 40 +5 Nm.

If a new brake package was installed:

- Tighten setscrew (42) to **15** Nm (brake package moves into contact).
- Loosen setscrew (42).
- Tighten setscrew (42) to **4.0 to 5.0** Nm (rear wheel locks).
- Loosen setscrew (42) by **1.5 turns (rear wheel turns)** and lock with nut
- Tighten hexagon nut (43) to 40 +5 Nm.

Note:
To lock, tighten hexagon nut (43) only.
The outer hexagon of the setscrew (42) is for holding only, not locking.



Install cylinder top (37).

Tighten hexagon screws (46) to 25 Nm.

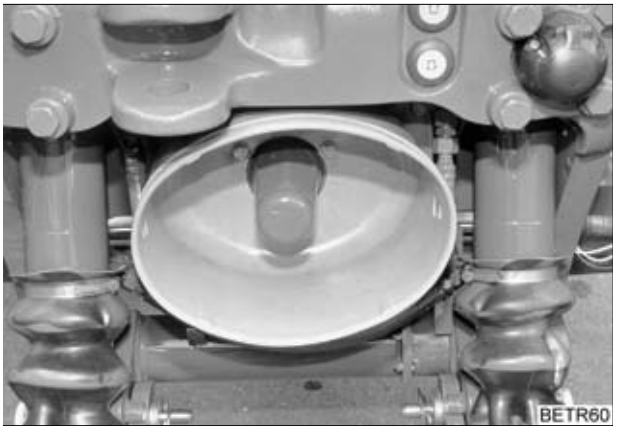
- Screw on the brake lines.
- Screw on the hand brake Bowden cable

Note:
Bleed the brake hydraulic system - see Chapter 1070 Reg.G

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Fav 700 *FENDT 700 Vario* *FENDT 800 Vario*	Transmission /Front PTO **Technical specifications of front PTO**	**A**

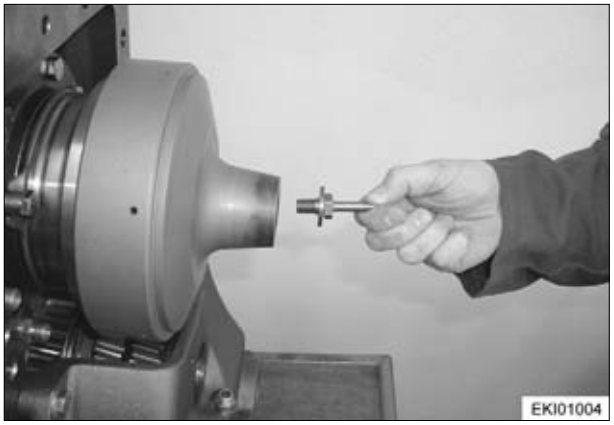


Danger:
After working with PTO, fit protective cover over PTO stub shaft!

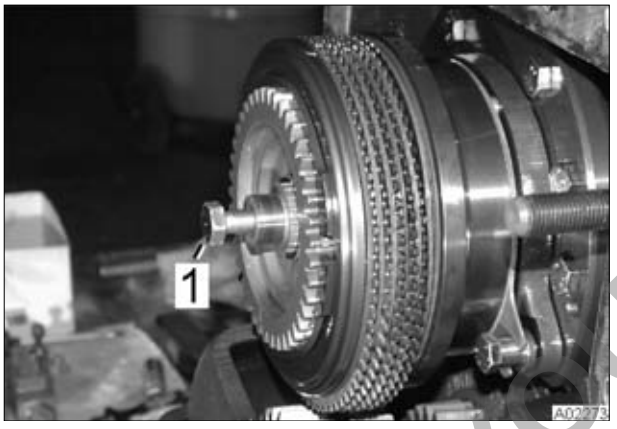
Note:
For operation of front PTO see section 8 of Operating Manual

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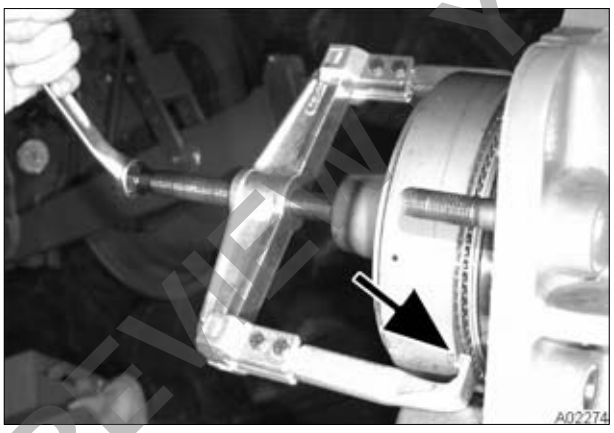
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Loosen nozzle (5). Lock shaft 1.

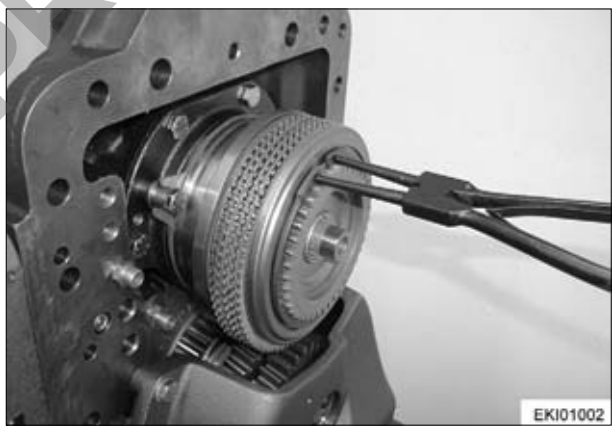


Screw the M12 screw (Item 1) into the nozzle bore. For clearer presentation, the picture shows the bell housing removed.



Set a two-arm puller on the edge (arrowed) of bell housing (3) and pull out bell housing (3).

Note:
Do not damage the externally toothed plates (16).



Unclip circlip (13). Remove supporting plate (14) and discs (16.17).

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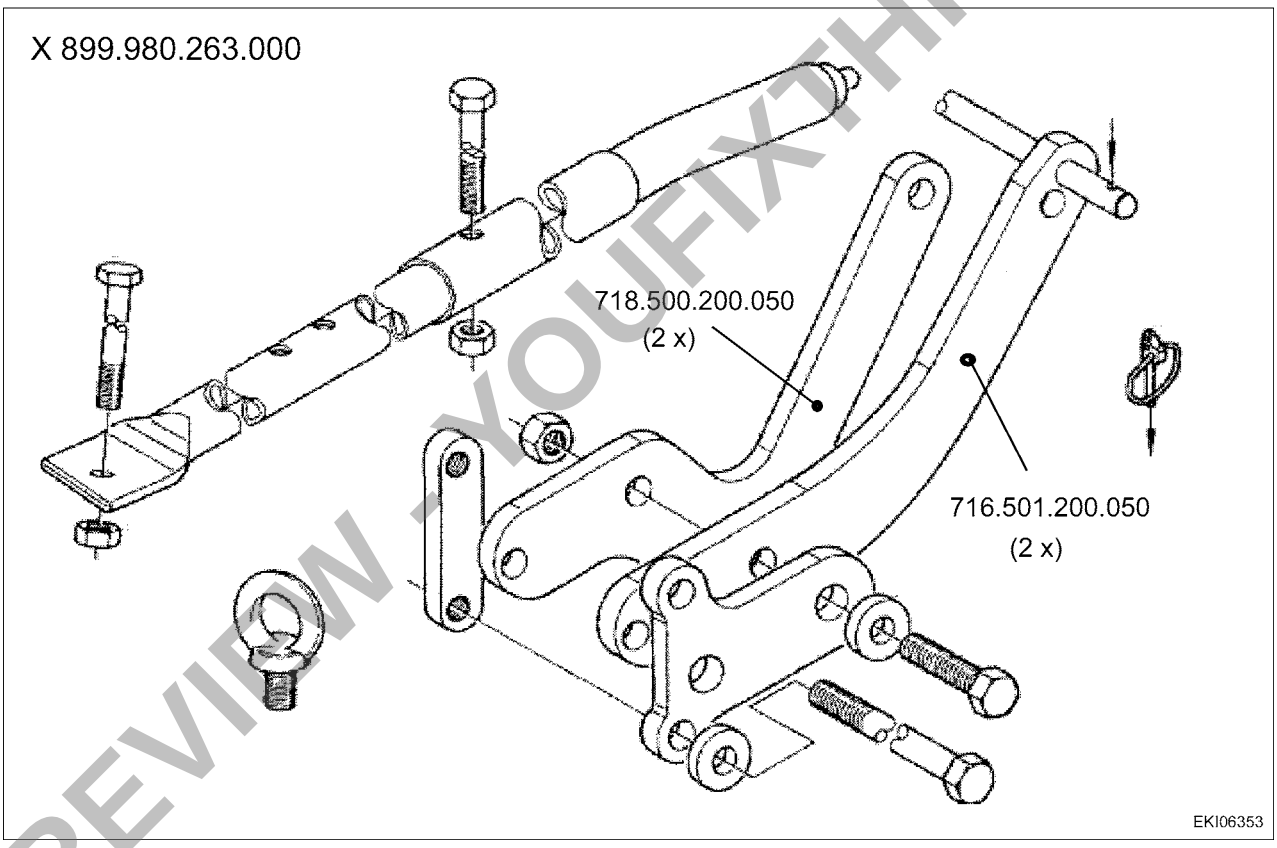
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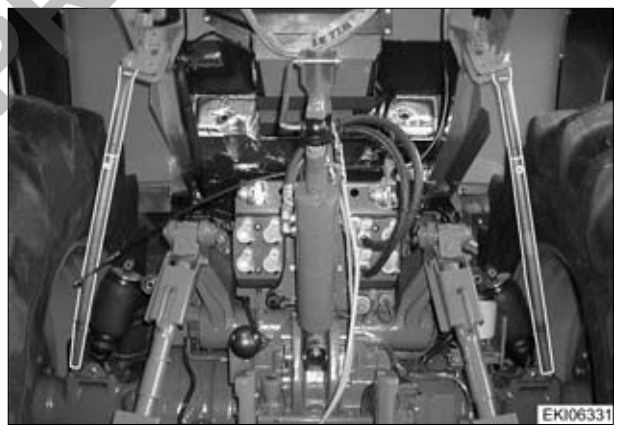


EKI05157

Preliminary work:
Chapter 8100 Reg. G - Tilting and lowering cab

Cab swivel device (F400, F700, F800V)





EKI05157

Note:
Install support

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B042 - sensor, EMR (crankshaft)

Fault code (Fendt)

1.2.02

Fault code (DEUTZ)

02

Fault display

Fault display in A007 - instrument cluster

Fault path

B042 - sensor, EMR (crankshaft)

Effect of fault

B041 - sensor, EMR (camshaft) takes over speed control in the A022 - ECU, EMR 2
No effect on driving the tractor

Possible cause of fault

- B042 - sensor, EMR (crankshaft) faulty
- Cable connection interrupted
- Distance to flywheel too far --> pulses faulty

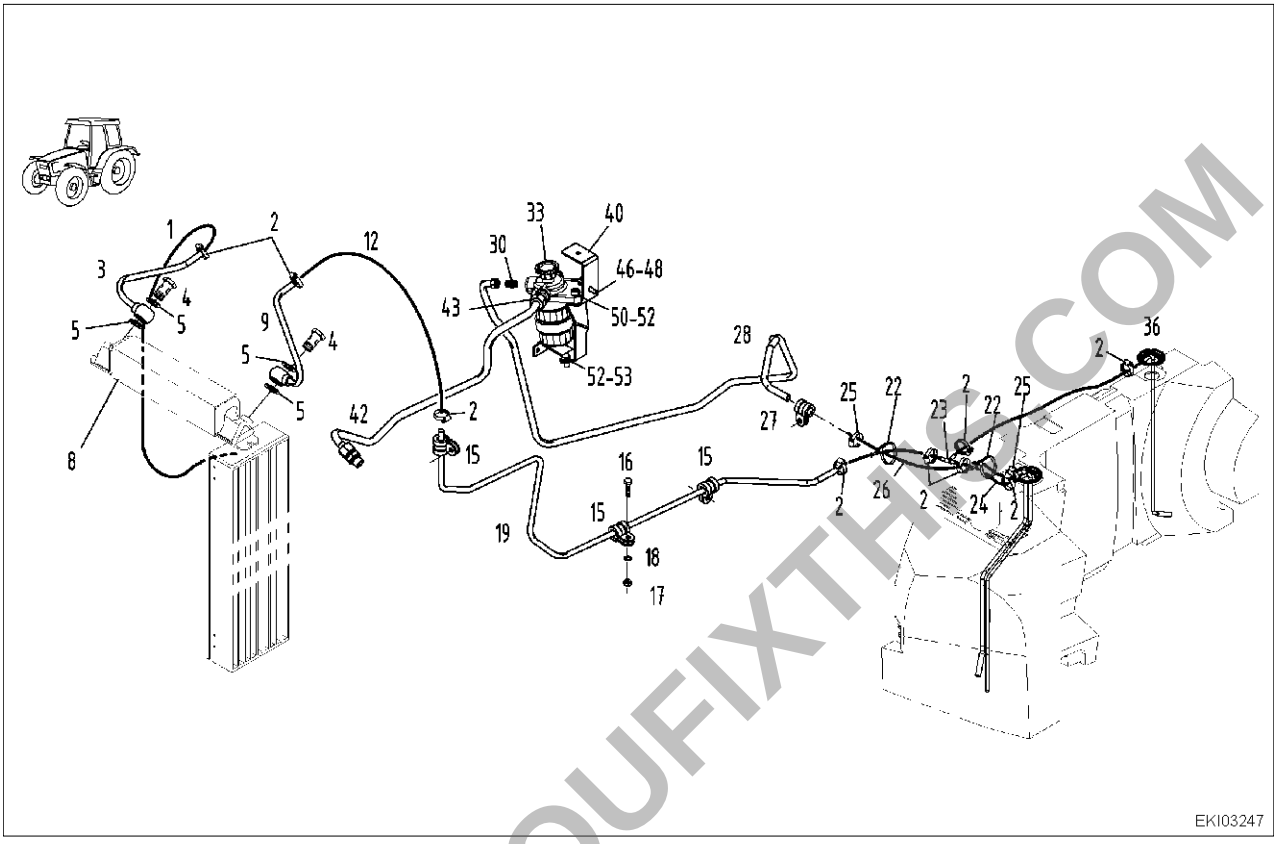
Test :

Chapter 2710 Reg. A - EMR 2 - General description
Chapter 9000 Reg. C - Electric circuit diagrams
Chapter 9000 Reg. E - A022 - ECU, EMR 2
Chapter 9000 Reg. E - B042 - sensor, EMR 2 (crankshaft)

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FENDT 700 Vario *FENDT 800 Vario*	Engine / Fuel system **Fuel system**	**C**

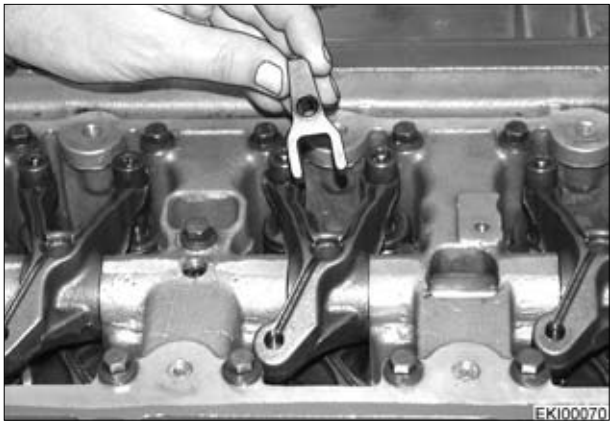


Item	Designation	Item	Designation
1	Pressure hose	25	Hose clip
2	Hose clip	26	Pressure hose
3	Fuel line	27	Pipe clip
4	Banjo bolt	28	Fuel line
5	Sealing ring	30	Screw socket
8	Fuel cooler	33	Hand primer with prefilter
9	Fuel line	35	Pressure hose
12	Pressure hose	36	Suction pipe
13	Self-tapping screw	40	Pump holder
14	Sheet-metal nut	42	Fuel line
15	Pipe clip	43	Screw socket
16	Hexagon screw	46	Hexagon screw
17	Hexagon nut	47	Washer
18	Spring washer	48	Spring washer
19	Fuel line	50	Hexagon screw
21	Pressure hose	51	Hexagon nut
22	Cable fastener	52	Spring washer
23	Suction valve ('Injector')	53	Hexagon screw
24	Pressure hose		

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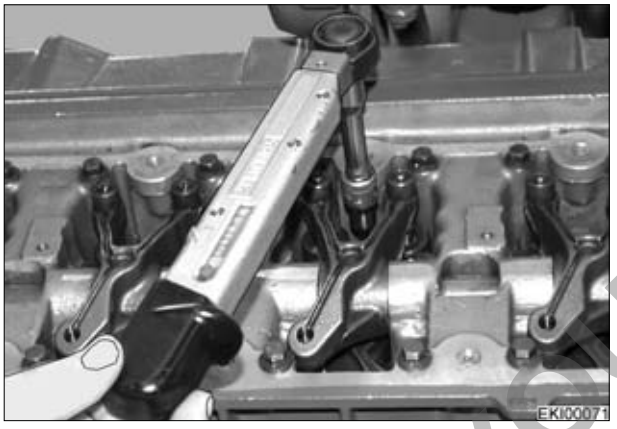
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Farmer 400 Fav 700 FENDT 700 / 800 Vario	Engine / Injectors **Removing and fitting injectors**	**G**



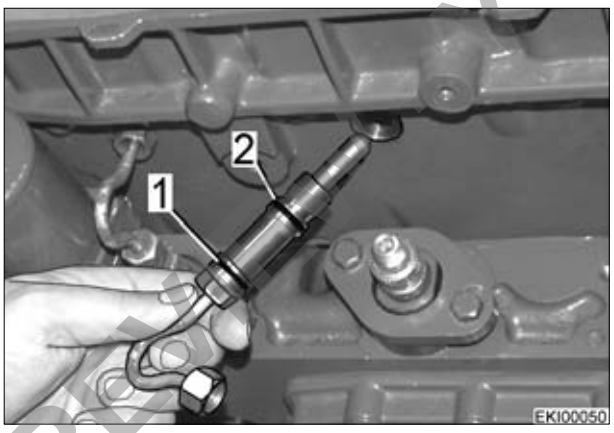
Locate clamping claw.

Note:
Stepped side must face downwards!
This centres injector nozzle in radial direction!



Tighten hexagon socket screw.

Tightening torque: 35 Nm



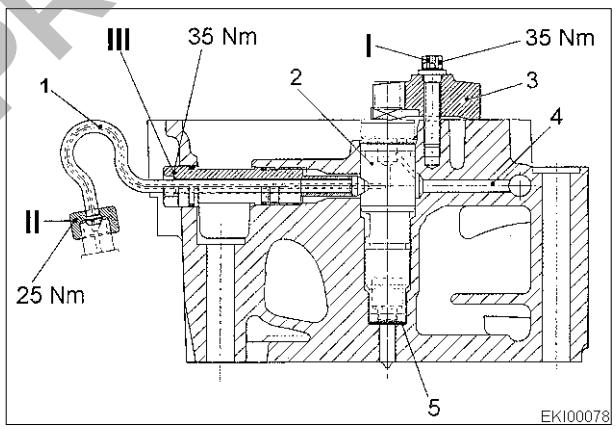
Fit new injection line with new O-ring.

O-ring (item 1) colour = green

O-ring (item 2) colour = violet

Hand-tighten gland nut and thrust piece to approx. 3 Nm.

Note:
Coat O-rings with 'AP 1908' compound.



Please follow the tightening sequence: I-II-III

Item 1 = Injection line can only be used once
Item 2 = Injector (opening pressure: 250 bar)
Item 3 = Claw ensures that injector is mounted centrally.
Item 4 = Fuel return flow (oil leakage line)
Item 5 = Copper washer, stepped side must face injector.

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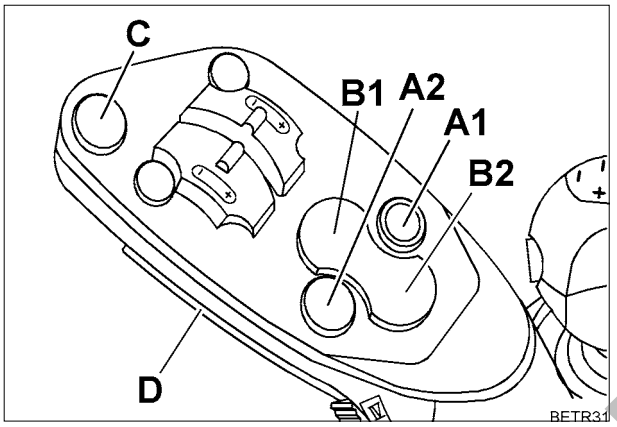
FENDT 700 Vario *FENDT 800 Vario* *FENDT 900 Vario*	Power lift / Electrohydraulic control EPC **Faults - electrics / electronic components EPC OBE**	**B**

Effects of faults: buttons for automatic operation

After fault warnings from following buttons,



EPC - automatic mode (on the A004 - control console)



C = Lift assembly stop button (front/rear)

B1 (automatic mode button) = Position: GO, 'Regulate'

B2 (automatic mode button) = Position: end, 'Lift'

A1 , A2 , D = no fault detection by the A014 - ECU, EPC OBE

it is only possible to return to automatic operation once the A014 - ECU has received fault-free message from the relevant button.

Automatic function - rear power lift		
Fault code	**Cause**	**Consequences and remedy**
5.1.91	A034 - joystick, automatic on/off key defective	Automatic mode rear not functioning
5.1.95	A034 - joystick, automatic mode stop key defective	Automatic switching on/off not possible

Fault classifications by the A014 - ECU, EPC OBE

Diagnostic function in the A014 - ECU, EPC OBE		
	Detect fault	
	Store fault	
	Fault weighting	
Serious faults	Intermediate faults	Minor faults
- control system stops - restart only possible by means of ignition switch	- control system stops - restart by unlocking	- control system continues working

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All types	Air compressor / General system **Troubleshooting flowchart, air compressor**	**B**

Warning:
Always disconnect the red coupling head (storage tank) first when unhitching the trailer or trailed vehicle.
(Only then is the trailer or trailed vehicle secured against rolling away!)

Pressure regulator vents too frequently without the brake being operated

Pressure regulator vents too frequently without the brake being operated		
I I		
Check operating range (pressure) of pressure regulator	Not OK	Set pressure regulator (fit new one if necessary)
I I		
OK		
I		
Check air compressor for leaks - screw couplings - drain valve - non-return valve in pressure regulator		

Tank pressure incorrect

Tank pressure not OK		
I I		
Check B019 - sensor, compressed-air volume (Chapter 9000 Reg. E)	Display incorrect	Fit new B019 - sensor, compressed-air volume
to do so, connect test pressure gauge to storage tank coupling head (red) and compare with display on A007 - display unit.		
I I		
Display correct		
I I		
Check air compressor for leaks	Leak found	Repair leak(s)
I		
No leak		
I		
See "Air compressor filling time too long" fault scenario		

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FENDT 700 Vario *FENDT 800 Vario* *FENDT 900 Vario*	Electrics / General system **A002 - ECU, enhanced control**	**E**

Pin on the A002	Pin description	Signal - type / condition	Signal at component	Signal from ECU (line interrupted)
		LED on	12 VDC	
25	K013 - Relay / X023 - socket (3rd circuit)	Digital output		0 VDC
		3rd circuit not actuated	0 VDC	
		3rd circuit actuated	12 VDC	
26	A002 - ECU, enhanced control (K-BUS interface)	CAN low	approx. 3.1 VDC	approx. 2.4 VDC
27	A002 - ECU, enhanced control (K-BUS interface)	CAN-high	approx. 2.0 VDC	approx. 2.5 VDC
28	A002 - ECU, enhanced control (+supply +UB 15)	D+ input	12 VDC	0 VDC
		(Note: see Measuring the supply voltage)		
29	B008 - sensor, transmission high pressure	Current input 0 mA - 20 mA		0 VDC
		Transmission neutral (transmission pressure = 0 bar)	0.8 VDC	
		Transmission active; run transmission against high pressure --> transmission pressure = approx. 550 bar)	3.9 VDC	
		(Note: see also Chapter 0000 Reg. A - Tractor - Diagnostics in the A008 Varioterminal) / Chapter 1005 Reg. E - Measuring transmission pressure		
30	B039 - high pressure sensor 2, push detection	Current input 0 mA - 20 mA		0 VDC
		Transmission neutral (transmission pressure = 0 bar)	0.8 VDC	
		Transmission active; run transmission in reverse against high pressure --> transmission pressure = approx. 550 bar)	3.9 VDC	
		(Note: see also Chapter 0000 Reg. A - Tractor - Diagnostics in the A008 Varioterminal) / Chapter 1005 Reg. E - Measuring transmission pressure		

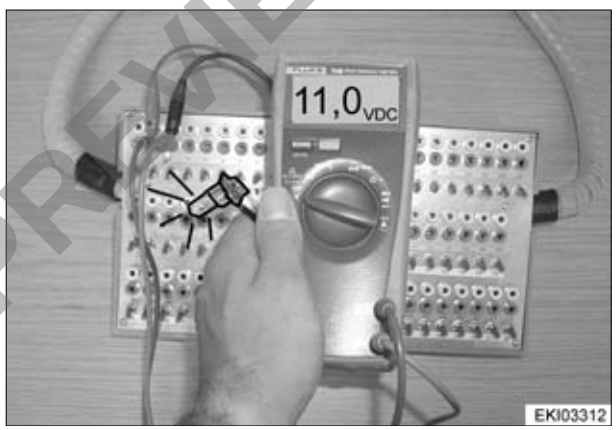
Pin on the A002	Pin description	Signal - type / condition	Signal at component	Signal from ECU (line interrupted)
31	Not assigned			
32	Not assigned			
33	Not assigned			

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FENDT 700 Vario *FENDT 800 Vario* *FENDT 900 Vario*	Electrics / General system **A014 - ECU, EPC 23 OBE**	**E**

+ UB 30 (battery voltage)				
Test	**Pin**	**Specified value**	**Condition**	**Possible cause of fault**
+ supply	2	approx. 12 VDC	Engine off	Fuse (F004) or in wiring
		approx. 13 VDC to 14 VDC	Engine running	
Ground	3			
+ supply	2	Voltage drop: max. 1 VDC from last reading	Also connect approx. 55 W bulb	Voltage must remain stable even under load
Ground	3			

+ UB 15 (switched voltage; ignition switch)				
Test	**Pin**	**Specified value**	**Condition**	**Possible cause of fault**
+ supply	1	approx. 12 VDC	Engine off	Fuse (F045) or in wiring
		approx. 13 VDC to 14 VDC	Engine running	
Ground	3			
+ supply	1	Voltage drop: max. 1 VDC from last reading	Also connect approx. 55 W bulb	Voltage must remain stable even under load
Ground	3			

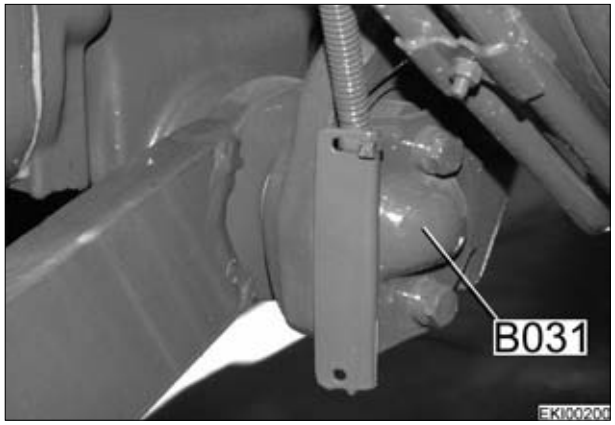


Note:
If voltage drop is greater than approx. 1 VDC, remove contact resistances (e.g. at fuse).

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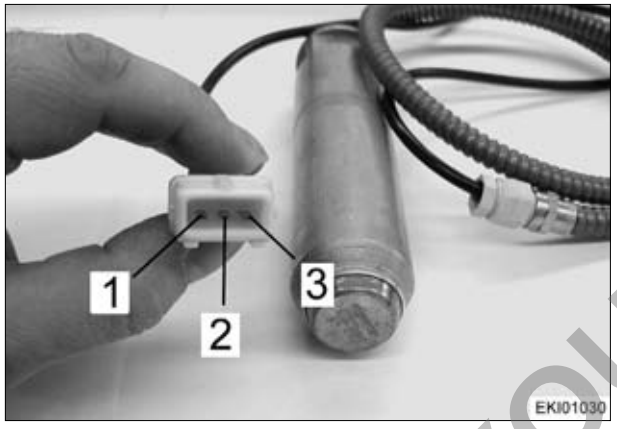
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FENDT 700 Vario FENDT 800 Vario FENDT 900 Vario	Electrics / General system **B031 / B032 - sensor, draft sensing pin (right / left)**	**E**



On left and right lower links (draft sensing pins B032 and B031)

Draft sensing pin measures tensile and compressive loads in lower links.



Pin	Function
1	Ground
2	Signal
3	+ supply

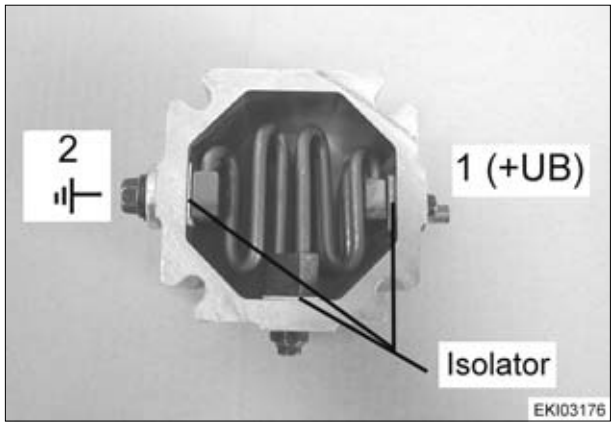


When checking signal voltage, press lower link back with tyre lever.

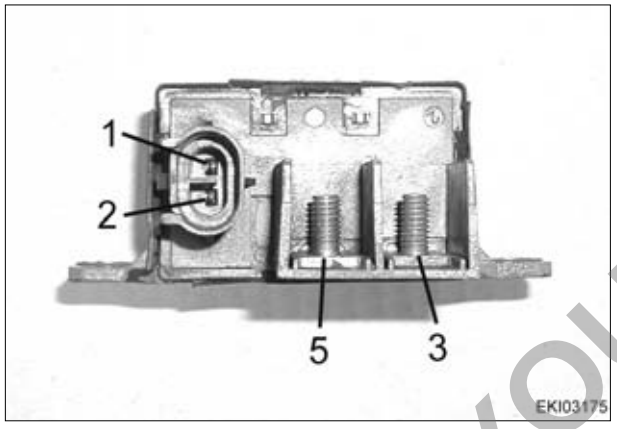
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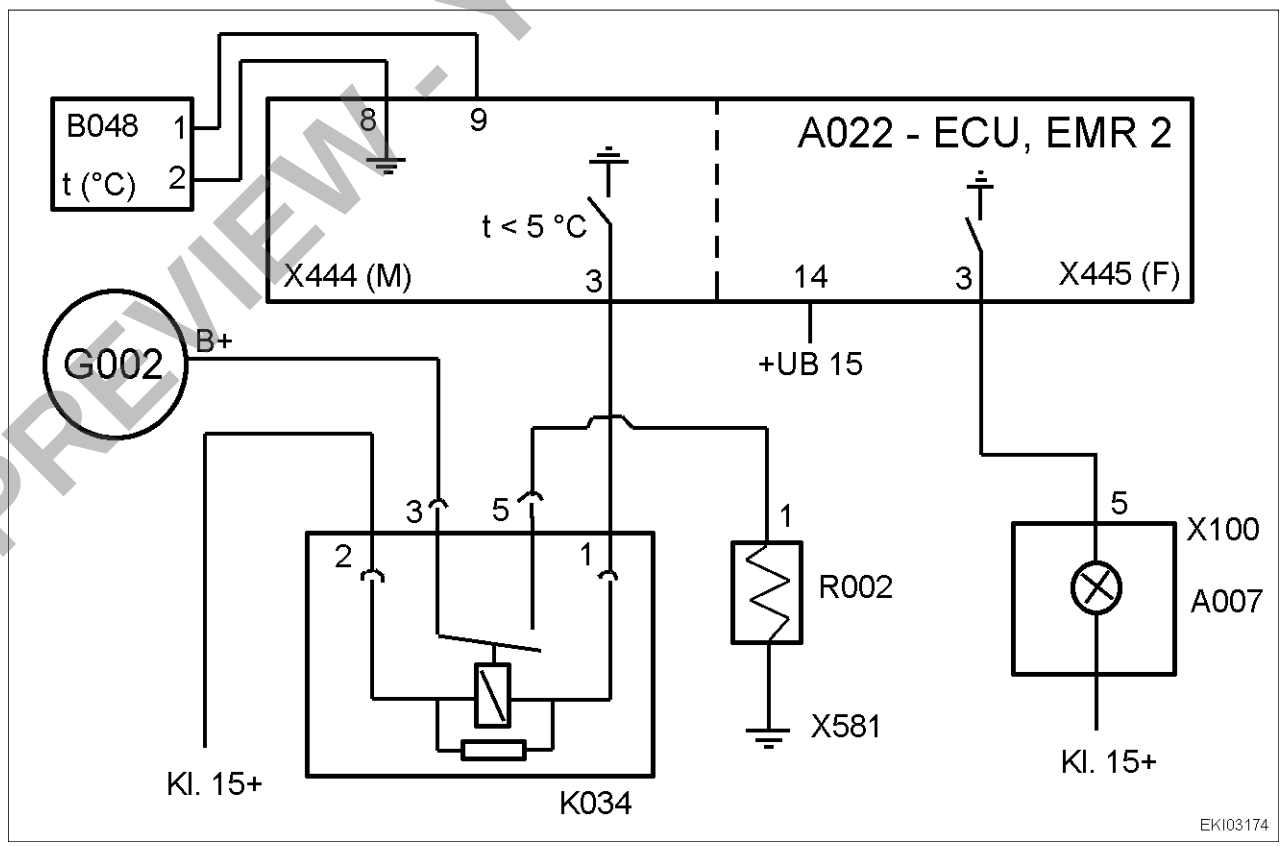
FENDT 700 Vario FENDT 800 Vario	Electrics / General system **R002 - heating flange / K034 - relay**	**E**



R002 - heating flange	
Pin	**Function**
1	+ UB (battery +)
2	Ground
Isolator	Isolator



K034 - relay	
Pin	**Function**
1	Solenoid (A022-ECU)
2	Solenoid (Cl 15+)
3	G002 (B+)
5	Heating flange



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Farmer 400 *Fav 700 / 900* *F 700 / 800 / 900 Vario*	Electrics / General system **Y003 - range 1 solenoid valve**	**E**

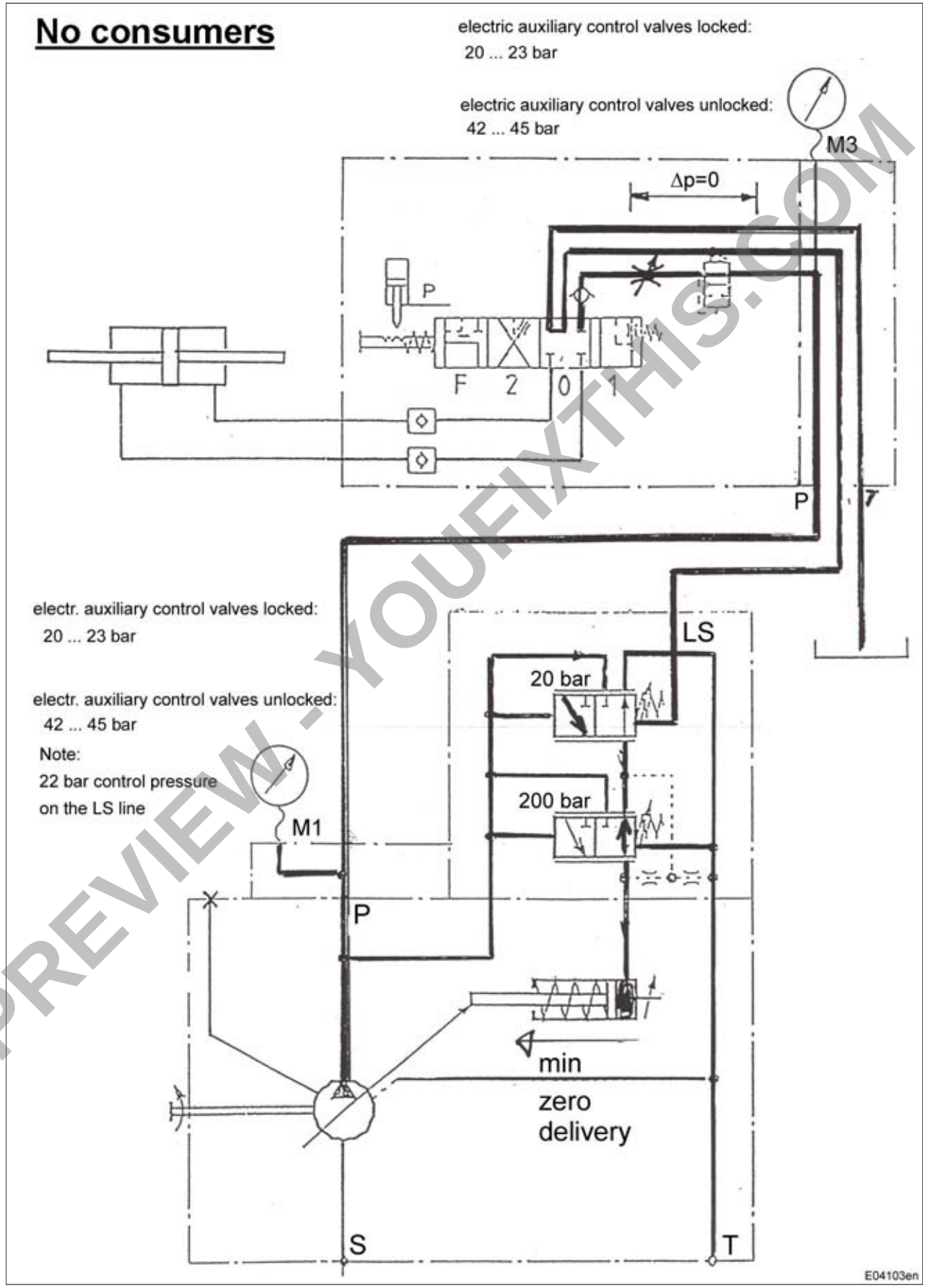
Measuring points on A002 - ECU	Pin
Vehicle ground	
Signal	61

Note:
Checking A002 - ECU, Chapter 9000 Reg. E

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Fav 700 *Fav 900* *F 700 / 800 / 900 Vario*	Hydraulic pump assembly / Transmission pump **Function of the LS pump (working and steering hydraulics)**	**A**

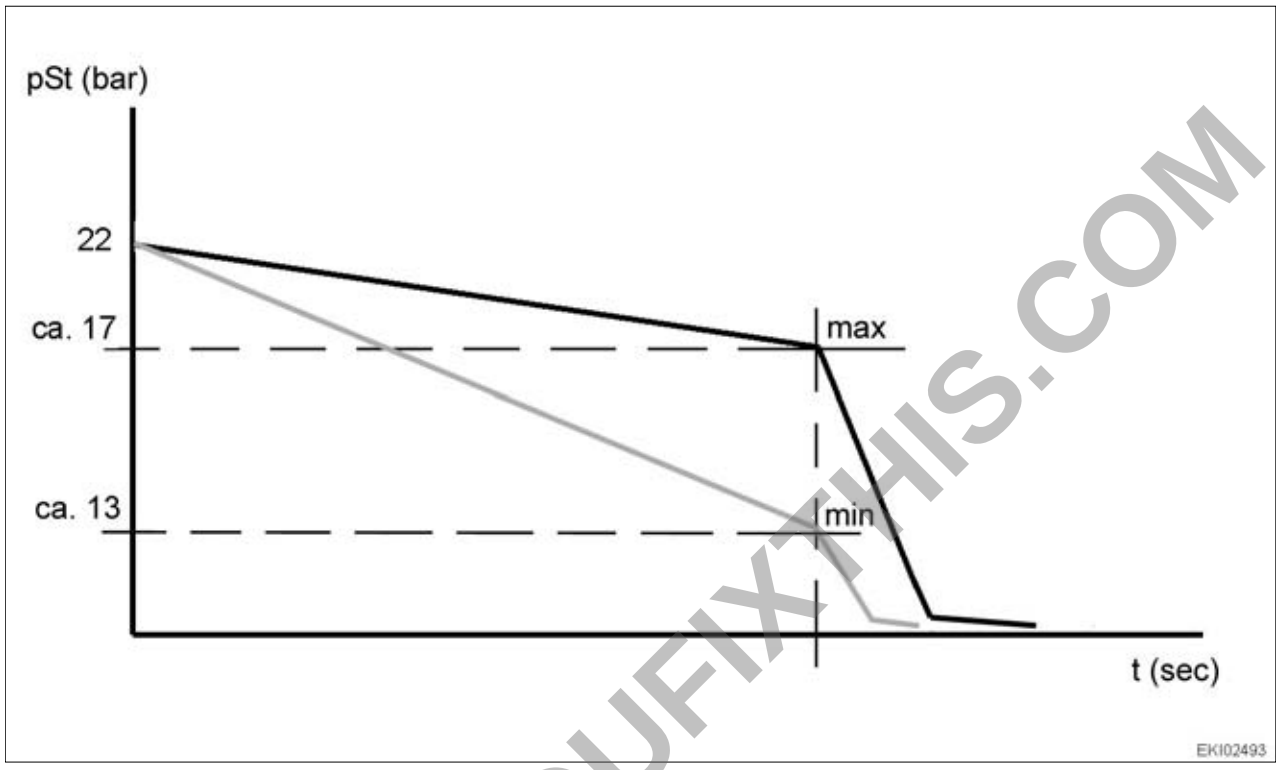


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Fav 700 *Fav 900* *F 700 / 800 / 900 Vario*	Hydraulics / Valve assemblies **Nitrogen diaphragm accumulator - STSP**	**E**

Pressure curve at measuring point M5



pSt = Control pressure (measured at measuring point M5)

Testing diaphragm accumulator - STSP
- Start tractor and unlock control valves.
- Control pressure of 22 bar is generated.
- Switch tractor off (ignition OFF).
- Provide external power source for Y032 - control pressure solenoid valve.
- The nitrogen diaphragm accumulator feeds more oil so that the control pressure is maintained.
- The control pressure of 22 bar gradually dissipates via the pilot valves (in the electric control valves) and via the load-sensing line.
- Once the pressure in the diaphragm accumulator has been relieved, the control pressure falls quickly

Target values:

Max. accumulator pressure (diaphragm accumulator relieved) approx. 17 bar

Min. accumulator pressure (diaphragm accumulator relieved) approx. 13 bar

If the accumulator pressure (diaphragm accumulator relieved) falls below approx. 13 bar:
- internal leak in diaphragm accumulator - STSP
- leak in non-return valve - RV7
- leak in pilot valve of electric control valves
- leak in load-sensing line to LS pump - PR

Note:

The time (t) in which the control pressure (pSt) falls depends on:
- the tolerances in the pilot valve (electric control valves) and in the load-sensing line
- the hydraulic oil temperature

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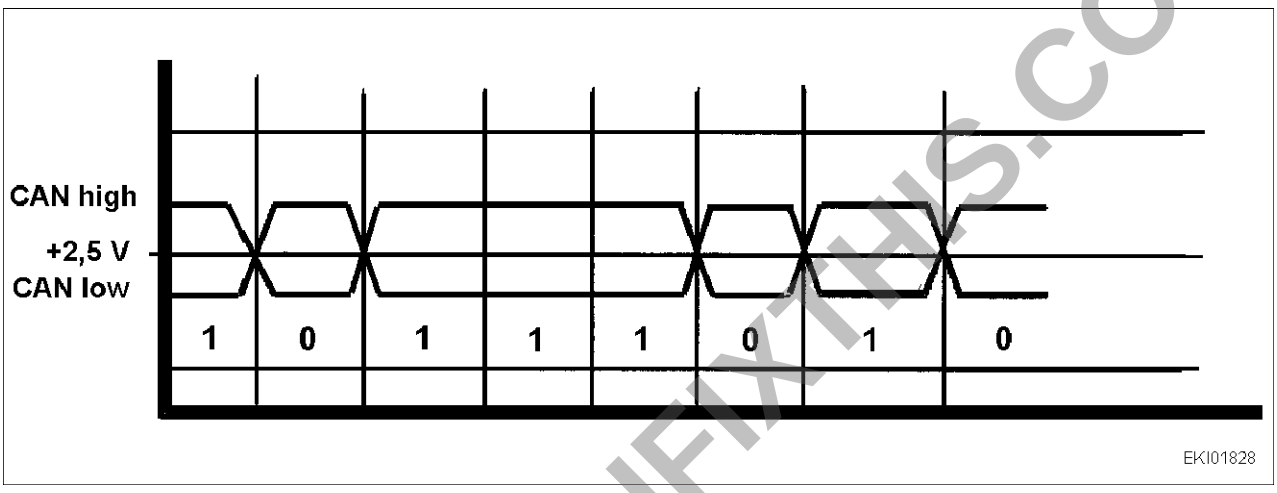
Farmer 400 Fav 700 / 900 F 700 / 800 / 900 Vario	Electronics / General system **CAN-bus**	**A**

There are two lines - CAN_High and CAN_Low - for signal transmissions.

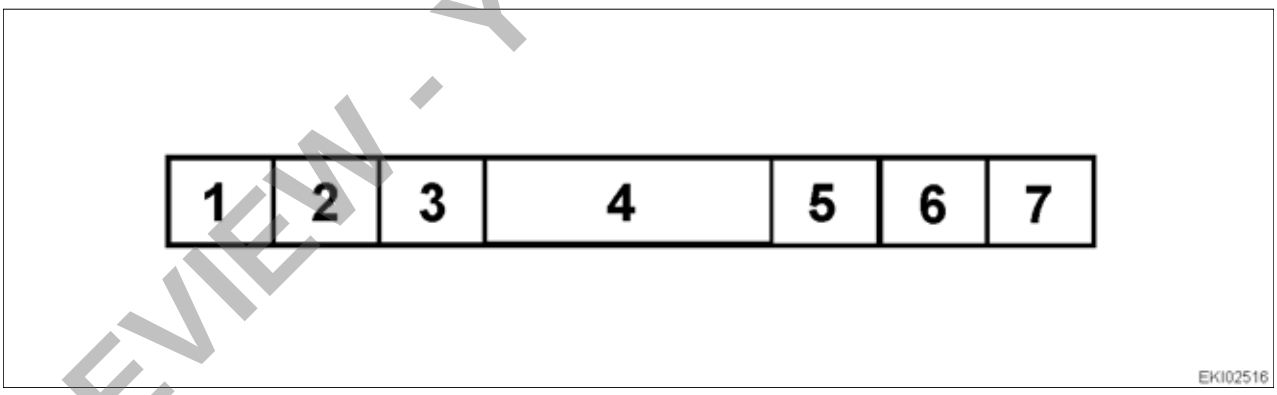
The CAN-bus can have two different statuses:

- Recessive status (bus is in high logical status)
- Dominant status (bus is in low logical status)

The information is transmitted by repeated inversion of the voltages in the CAN lines.
The 'neutral' voltage is 2.5 VDC in the active bus (LBS), while in a passive bus terminal (main bus and transmission bus) the lines have an initial voltage of 1.6 VDC and 3.2 VDC, respectively.



How does the CAN-bus system transmit its data?
A message is packaged in a form specific to the CAN-bus. This packaging is termed the 'frame'.
A frame (data package) consists of 7 parts:

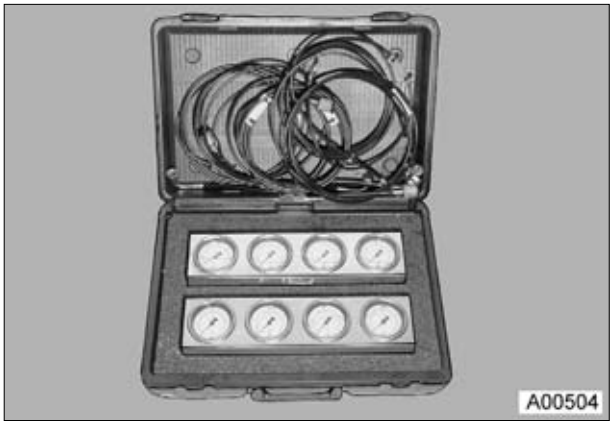


1	Start signal	Synchronises all control units
2	Assignment field	Describes message priority and type
3	Check field	Contains information on message size
4	Data field	Actual message/information
5	Test field	Contains test word in fixed format
6	Confirmation field	Contains confirmations from control unit
7	End signal	Marks end of message

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	Service / special tools **Special tools**	**A**



X 899.980.249.100

Measuring case with 8 pressure gauges, 8 high pressure hoses, 8 screw connections M 10x1 and 2 adapters M 10x1 / M 12x1.5. Pressure gauges: 1 x 16 bar, 5 x 60 bar, 2 x 600 bar



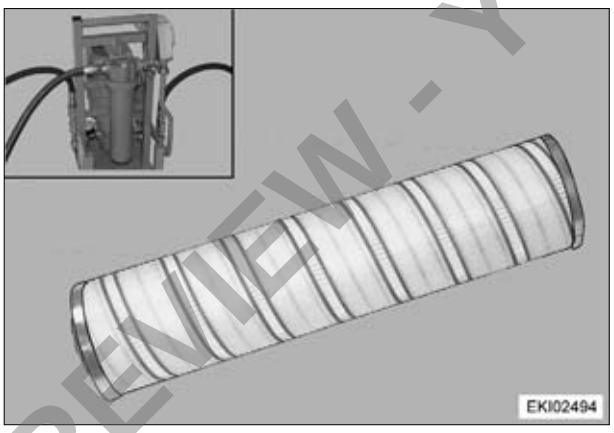
External oil filling unit with superfine pressure filter; always required if the high pressure circuit in the ML transmission has been opened

X 899.980.255.000

Oil filling unit

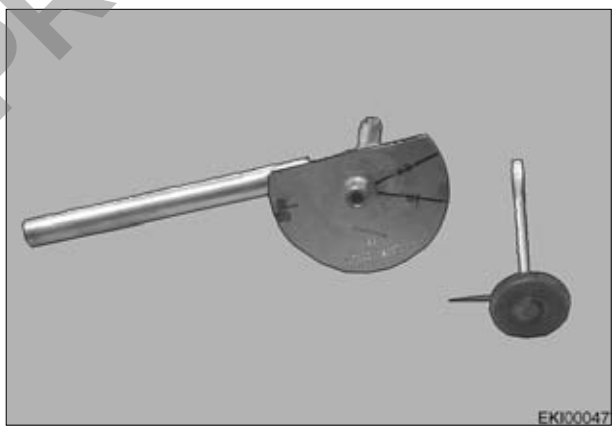
X 899.980.255.100

Superfine filter element



X 899.980.221.100

Ultra fine filter element in the oil filling station (Pall)



X 899.980.236

Valve clearance setting tool

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