Workshop Service Manual

FENDT 900 Vario - COM III

919 .. 0101-1000
919 .. 1001-
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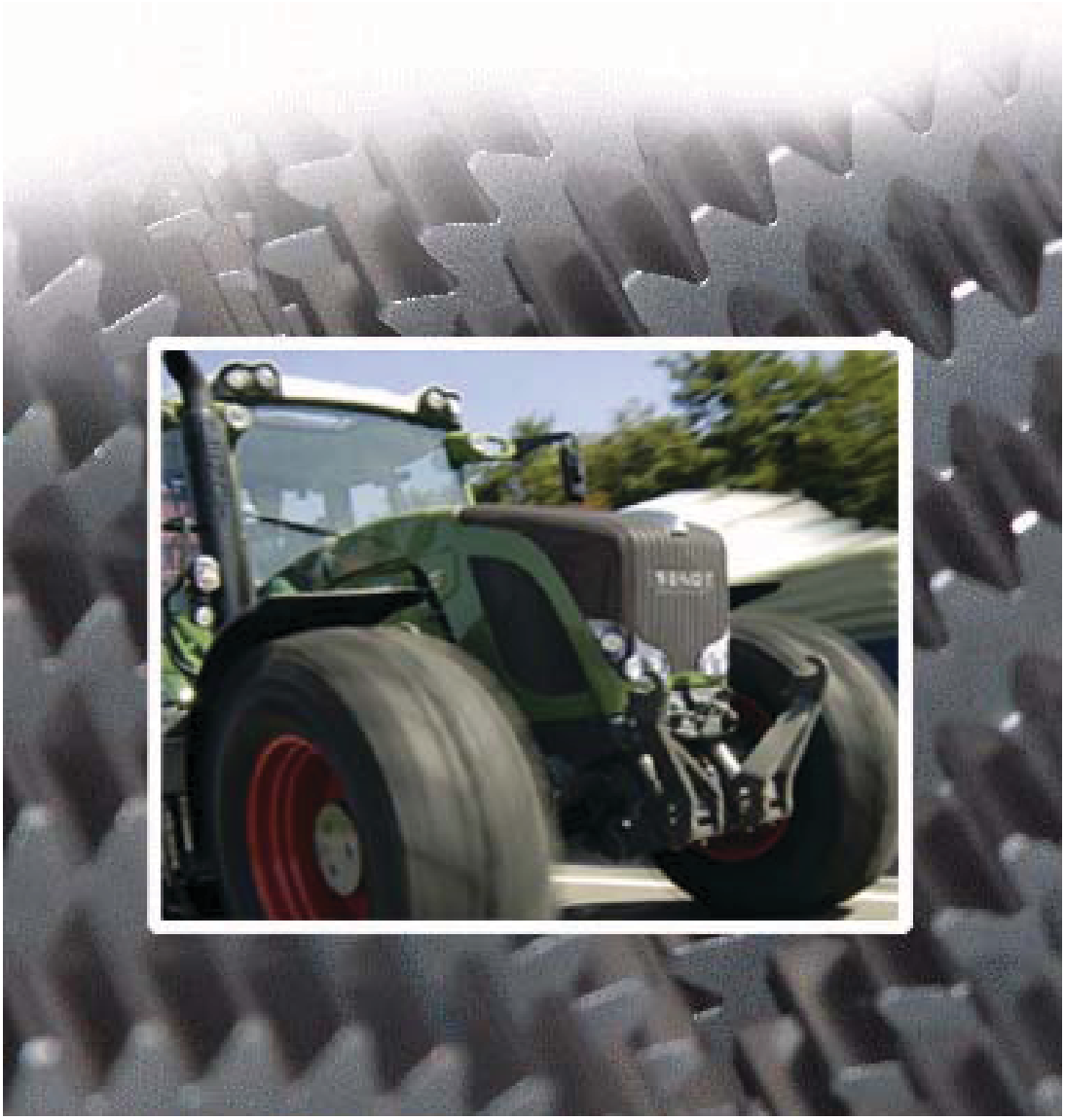

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FENDT

Volume 1

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 l 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 l 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 l d 2

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

Unkt Id 3

9410 Hydraulic pump installation/LS pump
9430 Hydraulic pump installation/steering pump
9534 Hydraulic piping/"Rüfa"reverse operation
9600 Overall system/hydraulic equipment
9605 Hydraulic equipment/hydraulic connections
9610 Hydraulic equipment/central control block (ZSB)
9620 Hydraulic equipment/valve fitting
9700 Overall system/electronics
9920 Service/special tools
9975 Service/SERDIA - Deutz engine diagnostics program

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

0000

Overall system/tractor

0000 Overall system/tractor

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A General

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1 Component overview

0000	Tractor – overall system

1000	Transmission
1005	Transmission control system
1010	Differential gear
1015	Axle drive
1030	Hand brake
1050	Housing
1070	Brake system
1080	Drive train
1090	Emergency actuation
1100	Clutch actuation
1150	Cardan brake
1170	ML range control
1200	Front PTO
1220	Live PTO
1320	Front wheel drive
1430	Hydrodamp
1432	Hydraulic pump
1470	Transmission lubrication
1490	Pump drive
1530	ML adjustment
1600	Enhanced control actuation valves
1620	Enhanced control actuation pipes

2000	Engine
2010	Cylinder head
2020	Speed setting
2050	Cooling system
2060	Fuel system
2170	Engine brake
2180	Cold-start system
2190	Intercooler
2210	Crankcase
2250	Engine preheater
2312	Lubrication
2710	Injection pump
2712	Injector valves
2714	Governor

3000	Front axle
3010	Front axle chock
3020	Axle body
3050	Suspension

3000	Front axle
3060	Suspension valve installation
3070	Suspension piping
3100	Track rod
3120	Steering cylinder
3170	Frame
3180	Cardan shaft
3190	Differential lock actuation

4000	Steering
4070	Steering wheel
4090	Hydraulic steering unit

5000	Vehicle layout
5010	Layout
5030	Driver seat
5050	Towing device
5161	Towing hitch
5200	Cab bearing, suspension

5500	Air conditioning system
5520	Compressor drive
5530	Coolant piping
5550	Evaporator
5560	Condenser
5570	Electrical wiring

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

8600	Power lift
8610	Electro-hydraulic EPC control
8618	External control
8631	Power lift control

8700	Three point linkage
8730	Lifting struts
8740	Support

8800	Compressed air system
8810	Air compressor
8820	Brake fittings
8830	Cables
8850	Electric actuation
8890	Air vessel

8900	Front loader
8910	Mounting frame
8915	Hydraulic equipment actuation
8955	3. Hydraulic circuit
8958	Multi coupling
5970	Piping
8990	Lift cylinder

9000	Electrical system
9010	Alternator
9015	Starter lock
9040	Fuses
9050	Battery installation
9060	Starter system

9200	Front power lift
9210	Linkage
9211	External control
9220	Cylinder
9230	Piping
9260	Enhanced power lift control
9280	Frame

9400	Hydraulic pump installation
9410	LS pump
9420	Transmission pump
9430	Steering pump

9500	Hydraulic piping
9510	Basic circuit
9516	Power lift
9525	With oil cooler
9530	Hydraulic trailer brake
9531	Steering
9534	Reverse operation

9600	Hydraulic equipment
9605	Hydraulic connections
9610	Central control block (ZSB)
9620	Valve installation
9666	External pressure supply
9690	Auxiliary valves

9700	Electronics
9710	Instrument panel
9715	Terminal
9717	LBS – agricultural bus system
9720	Sensor
9730	Radar sensor
9740	E-box
9750	Transmission actuator unit
9760	Driving switch
9770	Control panel
9780	Engine EDC
9790	Linkage ECU

9900	Service
9920	Special tools
9970	FENDIAS

2 Documentation layout

In this technical documentation, the different tractor types are basically divided according to components that, with a few technical exceptions, reflect the structure of replacement parts.
For example, these components may be "0000 – overall system"; "1005 – transmission control system"; "2000 – engine" etc.

see §1

Each component is divided into separate registers, identified by a register letter.

These are:

A . . . . . General
B . . . . . Faults
C . . . . . Documents and diagrams
D . . . . . Component position
E. . . . . Measuring and testing
F. . . . . Setting and calibrating
G . . . . . Repair
H . . . . . Service information

The content of this documentation consists of several individual documents in their own right. These documents can be used for a variety of technical documentation and are not type-specific.

Header and footer layout:

Header:
The header shows the group title, the document title and the register letter.

Footer:
Each document is specifically identified and has a version status and a release date that are shown at the bottom right **(A)** of the footer.
The applicability of each document according to chassis number range is shown at the bottom **(B)** of the footer.

NOTE: *If the document does not apply to all chassis numbers, this is indicated by the additional information*

"Refer to chassis number range"

(C).

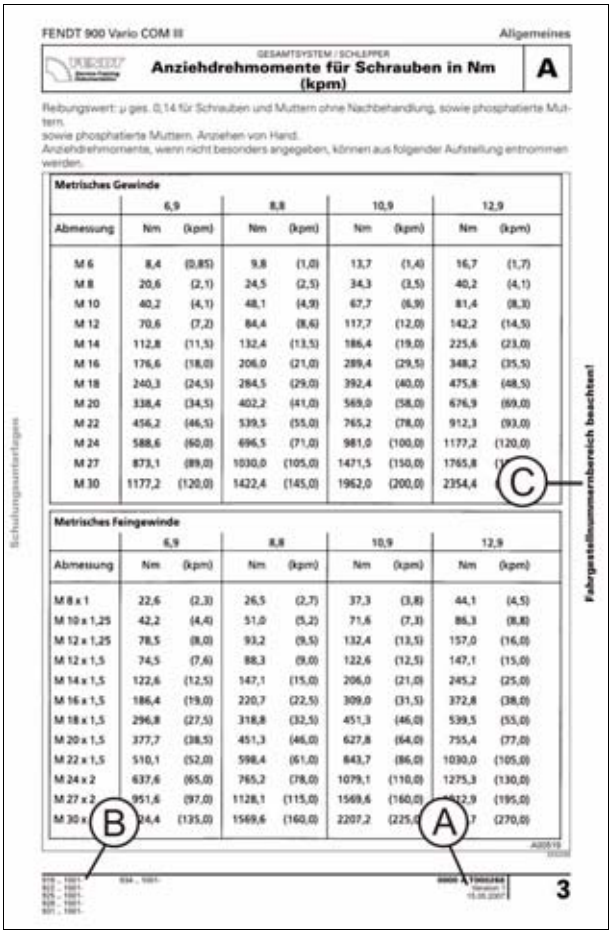


Fig. 1. I003732

Check Chassis Range!

3 Notes on documentation

To ensure that the information is structured in a user-friendly manner, the service documentation is divided into the operator's manual and the workshop manual.
The operator's manual includes a general description as well as instructions for all necessary maintenance work.
Knowledge of the owner's manual is essential to understand the workshop manual. This is particularly important for safety instructions.
The workshop manual describes repairs to the engine and components, which will require more effort and suitably qualified specialists to carry out.

Note
This workshop manual provides notes for trained technicians to maintain our tractors.
Read and observe the information in this documentation. This will help you prevent accidents and safeguard the manufacturer's warranty.
The respective accident prevention rules as well as other generally recognised safety and occupational health rules must be observed.
The tractor is built solely for the purpose defined by the implement manufacturer (intended use). Any other type of use is considered unauthorised. The manufacturer bears no liability for any damage resulting from improper use. The user bears this risk alone. Intended use includes maintaining operating, service and maintenance conditions as specified by the manufacturer.
The tractor may only be used, serviced and maintained by people familiar with the equipment and who have been informed about the dangers. Ensure that this documentation is available to everyone involved in operating, servicing and maintaining the tractor and that the contents have been understood. Not observing this documentation can lead to faults, engine damage and personal injury, for which the manufacturer assumes no liability. The prerequisite for the tractor being correctly serviced and maintained is the perfect condition and availability of all necessary equipment, standard tools and general workshop equipment as well as special tools. The use of special tools is restricted to where absolutely necessary, and are displayed both where they need to be used and in a summary at the end of the manual.
The tractor must be maintained according to its proper use. **Always** replace parts with genuine FENDT spare parts! When ordering parts, please provide the chassis number as per the most up-to-date spare parts documentation. The layout of components in this workshop manual matches **Epsilon**.
Only parts approved by the manufacturer for that specific purpose may be used for any alterations. The manufacturer will not accept liability for any damage resulting from unauthorised modifications to the tractor. Non-compliance invalidates the warranty!
Workshops should also refer to documentation on maintenance work and technical data.
Once maintenance is complete, take a test drive to ensure the vehicle's correct operation and road safety.
We reserve the right to make design changes in light of technical developments.

Notes on Register G - Maintenance
The assembly/disassembly instructions shown correspond to the design status at the time the workshop manual was drawn up.
Further technical development of the product and additions related to different versions may require alternative working processes that do not pose too many difficulties to trained and qualified specialists.
These assembly/disassembly instructions shall be invalidated upon issue of the next version of this document.

4 Safety briefing and measures

Important notes on work safety

The statutory accident prevention regulations (available from professional associations or specialist shops) must be observed. These depend on the operating site, operating mode and fuels and lubricants used. Special protective measures dependent on the respective procedures are specified in the corresponding repair guidelines and highlighted.

This handbook uses the following safety tips

DANGER: Indicates an impending dangerous situation that will lead to serious injury or death if not avoided.

WARNING: Indicates a potentially dangerous situation that could lead to serious injury or death if not avoided.

CAUTION: Indicates a potentially dangerous situation that could lead to minor injury if not avoided.

Please observe the following when carrying out maintenance or service work to the tractor:

Only the documentation associated with the vehicle (workshop manual and operator's manual) must be used to complete any pending work.

1. General

- Only briefed personnel may operate the tractor or carry out maintenance work.
- Only use qualified specialists to carry out repairs or service work.
- Nobody may be in the cab while work is being carried out under the jacked-up tractor.
- Relieve pressure from implement lines, e.g. front loader.
- Keep clear of any suspended, unsecured load (lifted cab etc.).
- Never open or remove any safety devices while the engine is running.
- Pressurised fluids (fuel or hydraulic oil) escaping under high pressure can penetrate the skin and cause severe injuries. If this should occur, seek medical advice immediately to avoid the risk of serious infection.
- Keep at a safe distance from hot areas.
- Pressure accumulator and connected lines are highly pressurised. Only remove and repair in accordance with instructions set out in the workshop manual.
- To avoid eye injury, do not look directly at the surface of the activated radar sensor.
- Dispose of oil, fuel and filters properly.
- Specialist knowledge and special fitting tools are required to fit tyres.
- Run the tractor for a short time, then retighten all wheel nuts and bolts and check them regularly.
  For correct torque values refer to TECHNICAL DATA.
- Before working on the electrical system, always remove the earth strap from the battery. Observe the following when carrying out electric welding. Before carrying out welding work on tractor or mounted implements, ensure that both battery terminals are disconnected. Attach the earth terminal of the welding appliance as close to the welding spot as possible.
- Caution is required when dealing with brake fluid and battery acid as these are toxic and corrosive!
- Only use genuine FENDT spare parts.

2. Working on the front axle suspension

DANGER:
– **The front axle suspension pressure lines between the central control block (ZSB) and the suspension cylinders, and**
– **the pressure accumulator on central control block ASP1 and**
– **the piped pressure accumulator ZSP**

are under 200 bar pressure, even when the engine is switched off and the suspension is lowered (= locked).

Safety measures:
Prior to each repair and after releasing or opening in this area, the pressure must be released manually.

NOTE: *The "Lock suspension/lower suspension" command has no effect!*
Even externally energising the solenoid valves ***Y013*** *- Suspension load pressure/lowering solenoid valve and* ***Y014*** *- Raise suspension solenoid valve is not effective!*
(Hydraulically unlockable non-return valves are fitted, RVFH raise suspension non-return valve/RVFS lower suspension non-return valve).

To release pressure:

– **AVF1** - Lock valve, suspension 1
open to left, chassis may lower
– **AVF2** - Lock valve, suspension 2
open to left, rebound accumulator will be relieved

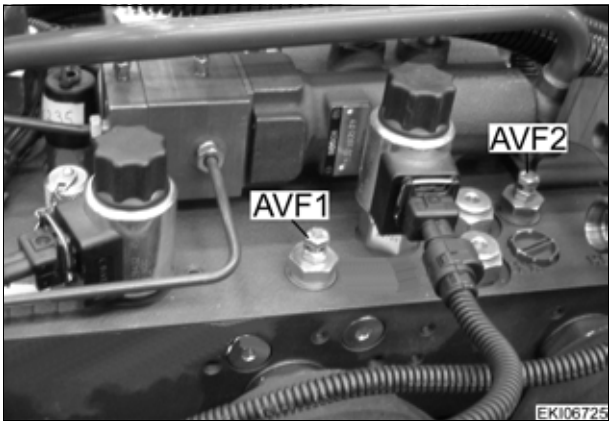


Fig. 2. I005112

Check:
As the oil temperature rises, the emptying accumulator will make a flowing sound (barely audible in winter).

Check Chassis Range!

3. Working on the engine

– After switching off the engine, wait 30 seconds before carrying out any work on the fuel system.
– Only start the engine once all safety guards have been attached and nobody is standing in the danger area.
– Never let the engine run in enclosed spaces with no exhaust gas suction system.
– Cleaning, maintenance and repair work may only be carried out once the engine is switched off and secured to prevent it starting.
– Injection lines and high-pressures lines must not be deformed.
– Any damaged injection line or high-pressure line must be replaced.
– Do not loosen any injection lines for high-pressure fuel lines while the engine is running.
– Before carrying out checks to the running engine, always perform a visual check of all high-pressure components. Suitable protective clothing (e.g. protective goggles) should be worn while doing this. Leaks indicate potential sources of danger for workshop personnel.
– In the event of leaks to the high-pressure fuel system, always remain out of range of any possible fuel spray to avoid serious injury.
– Even when no leaks to the high-pressure fuel system can be detected, workshop personnel should avoid the immediate danger area and wear suitable protective clothing (such as protective goggles) when carrying out checks to the running engine and during the first test run.
– Smoking is forbidden while carrying out work to the fuel system.
– Do not work in the proximity of sparks or naked flames.
– Never disconnect an injector while the engine is running.

4. Working on the PTO

– Always switch off the engine before fitting or removing the drive shaft. PTO in "0" position!
– When working on the PTO, allow no one in the vicinity of the rotating PTO or drive shaft.
– Ensure the drive shaft shield pipe and protective funnel and the PTO guard are fitted.
– After deactivating the PTO, it is possible that parts on the mounted implement may continue to run as a result of the centrifugal mass. Whilst this continues, do not get too close to the implement. Work may only be carried out when the moving parts of the mounted implement have come to rest.
– When the drive shaft is removed, cover the PTO with its protective cap.
– Nobody should be in the cab when installing and removing the drive shaft.
Operation of controls for the tractor and mounted implements by people in the cab, especially children, may result in severe or fatal injury.

5. Working on the front loader

– Before undertaking maintenance work, lower the front loader to the ground, switch off the engine and remove the ignition key.
– If the pipe rupture safety feature activates, support the load before starting repair work, and slowly retract the cylinder.
– Carry out a regular check of hydraulic hoses and lines for signs of damage and aging and replace with genuine spare parts in good time.
– Following installation and repairs, operate the tractor for a short time, then retighten all nuts and bolts and check them regularly.
– Retighten eccentric bolt for front loader attachment, if necessary.

6. Working on the brake system

– Always check the brakes before driving.
– Adjustments and repairs to the brake system must be carried out in specialist workshops or by approved brake repair technicians.
– It must not be possible to brake individual wheels when driving (lock pedals)!
– Check the level of brake fluid at regular intervals. Only use the brake fluid specified and replace according to instructions!

Disposal

The work described in the operator's manual and workshop manual includes replacing parts, fuel and lubricants. These renewed parts/fuel/lubricants must be stored, transported and disposed of in accordance with regulations. The repairing workshop bears responsibility for this. The disposal encompasses the recycling and final disposal of parts/fuel/lubricants with recycling having the higher priority. Details about disposal and monitoring are specified in regional, national and international laws and directives, the observation of which is the sole responsibility of the repairing workshops.

5 Biodiesel

Fuel quality

RME=**R**apeseed oil **M**ethyl **E**ster,
VME=**V**egetable oil **M**ethyl **E**ster fuel
Use in accordance with DIN EN 14214.
Cold-pressed rapeseed oil is **not** approved for use with standard tractors.
Only cold-pressed fuel in accordance with DIN V 51605 is approved for Greentec tractors.

The following notes apply to the use of RME and VME

Instructions for use
Biodiesel is suitable for winter temperatures down to approx. -10 °C.
At temperatures below -10 °C, diesel fuel needs to be added to prevent flocculation of the biodiesel. The ratio of the two must be approx. 50:50. Diesel fuel must be used at temperatures below -16 °C.
Biodiesel can be mixed in any proportion with diesel fuel.
Engine performance is reduced by 10–15%.
There is a slight change in fuel consumption.
If the tractor is not going to be used for some time (3 months or more), fill with diesel fuel to prevent the injection components from seizing.

Maintenance intervals
Oil and oil filter change intervals must be halved.
If conventional diesel fuel has been used in the past, the fuel filter must be replaced after fuelling with biodiesel a few times. Since biodiesel acts as a solvent, any diesel residue may block the fuel filter.

Special features of biodiesel
Biodiesel is obtained from vegetable oil (mainly rapeseed oil) by means of a chemical process, where the vegetable oil is mixed with methanol and converted to biodiesel using a catalyst.
Biodiesel is virtually sulphur-free and therefore produces almost no sulphur dioxide during combustion.

The exhaust gas contains reduced levels of

than when using conventional diesel fuel. Biodiesel is more easily biodegradable and has less of an effect on the ground and groundwater in the event of accidental spills.

IMPORTANT: *In spite of the high environmental compatibility of biodiesel, accidental spills must always be reported.*

6 Biodegradable hydraulic oil

Oil quality

Use rapeseed-oil and synthetic-based HEES biodegradable hydraulic oil with a viscosity in accordance with ISO VG 32-ISO VG 46.

NOTE: *Polyglycol-based synthetic oils cannot be used.*

Instructions for use

Biodegradable hydraulic oil is suitable for winter temperatures down to approx. -15 °C.
Vegetable-based hydraulic oil may thicken in outside temperatures below approx. -15 °C or if the tractor is not used for long periods of time. After a cold start, allow a short warm-up time at medium engine speed to ensure safe operation of the hydraulic steering and linkage. In extremely low temperatures, it may be necessary to warm up the entire tractor.
Avoid mixing with mineral oils, e.g. with any oil remaining in the system or by connecting and operating an external implement. This may affect the positive environmental properties of the fluid, and will make it more difficult to dispose of (it will then have to be considered as special waste).
Current legislation and the instructions of the oil manufacturer must be observed when disposing of oil.
A mixture containing more than 20% may result in alterations in viscosity and may lead to problems with the hydraulic valves.

Maintenance intervals

The oil and oil filter need to be changed every 1000 running hours or every year, whichever occurs first.
When switching to biodegradable hydraulic oil, change the hydraulic oil filter after approx. 50–100 running hours. Since biodegradable hydraulic oil acts as a solvent, any oil residue may block the filter.

Special features of biodegradable hydraulic oil

Biodegradable hydraulic oil is more easily biodegradable and has less of an effect on the ground and groundwater in the event of accidental spills.

IMPORTANT: *In spite of the high environmental compatibility of biodegradable hydraulic oil, accidental spills must always be reported.*

7 Tightening torques for bolts in Nm (kpm)

Friction value: μ total 0.14 for screws and nuts without after-treatment
and phosphated nuts. Tighten by hand.
When tightening torques are not specified, they can be found in the following diagram.

Metrisches Gewinde

	6,9		8,8		10,9		12,9	
Abmessung	Nm	(kpm)	Nm	(kpm)	Nm	(kpm)	Nm	(kpm)
M 6	8,4	(0,85)	9,8	(1,0)	13,7	(1,4)	16,7	(1,7)
M 8	20,6	(2,1)	24,5	(2,5)	34,3	(3,5)	40,2	(4,1)
M 10	40,2	(4,1)	48,1	(4,9)	67,7	(6,9)	81,4	(8,3)
M 12	70,6	(7,2)	84,4	(8,6)	117,7	(12,0)	142,2	(14,5)
M 14	112,8	(11,5)	132,4	(13,5)	186,4	(19,0)	225,6	(23,0)
M 16	176,6	(18,0)	206,0	(21,0)	289,4	(29,5)	348,2	(35,5)
M 18	240,3	(24,5)	284,5	(29,0)	392,4	(40,0)	475,8	(48,5)
M 20	338,4	(34,5)	402,2	(41,0)	569,0	(58,0)	676,9	(69,0)
M 22	456,2	(46,5)	539,5	(55,0)	765,2	(78,0)	912,3	(93,0)
M 24	588,6	(60,0)	696,5	(71,0)	981,0	(100,0)	1177,2	(120,0)
M 27	873,1	(89,0)	1030,0	(105,0)	1471,5	(150,0)	1765,8	(180,0)
M 30	1177,2	(120,0)	1422,4	(145,0)	1962,0	(200,0)	2354,4	(240,0)

Metrisches Feingewinde

	6,9		8,8		10,9		12,9	
Abmessung	Nm	(kpm)	Nm	(kpm)	Nm	(kpm)	Nm	(kpm)
M 8 x 1	22,6	(2,3)	26,5	(2,7)	37,3	(3,8)	44,1	(4,5)
M 10 x 1,25	42,2	(4,4)	51,0	(5,2)	71,6	(7,3)	86,3	(8,8)
M 12 x 1,25	78,5	(8,0)	93,2	(9,5)	132,4	(13,5)	157,0	(16,0)
M 12 x 1,5	74,5	(7,6)	88,3	(9,0)	122,6	(12,5)	147,1	(15,0)
M 14 x 1,5	122,6	(12,5)	147,1	(15,0)	206,0	(21,0)	245,2	(25,0)
M 16 x 1,5	186,4	(19,0)	220,7	(22,5)	309,0	(31,5)	372,8	(38,0)
M 18 x 1,5	296,8	(27,5)	318,8	(32,5)	451,3	(46,0)	539,5	(55,0)
M 20 x 1,5	377,7	(38,5)	451,3	(46,0)	627,8	(64,0)	755,4	(77,0)
M 22 x 1,5	510,1	(52,0)	598,4	(61,0)	843,7	(86,0)	1030,0	(105,0)
M 24 x 2	637,6	(65,0)	765,2	(78,0)	1079,1	(110,0)	1275,3	(130,0)
M 27 x 2	951,6	(97,0)	1128,1	(115,0)	1569,6	(160,0)	1912,9	(195,0)
M 30 x 2	1324,4	(135,0)	1569,6	(160,0)	2207,2	(225,0)	2648,7	(270,0)

A00519

Fig. 3. I000499

8 History of the FENDT 900 VARIO (COM III) farm tractor

Fig. 4. FENDT 900 Vario

Tractor type	922 Vario	924 Vario	927 Vario	930 Vario	933 Vario	936 Vario
Chassis number	919 /…/ 0101 and up	922 /…/ 0101 and up	925 /…/ 0101 and up	928 /…/ 0101 and up	931 /…/ 0101 and up	934 /…/ 0101 and up
Technical specification extract: diesel engine						
Engine type (Deutz)	TCD 2013 L6 4V					
Engine oil (see also: fuels and lubricants in Operating Manual)	SHPD engine oil SAE 10W40					
Rotational direction	Viewed from left on flywheel					
Cylinder	6-cylinder					
Cylinder liner	Wet cylinder liner					
Piston cooling	Oil-cooled pistons (ring channel cast into piston head)					
Number of valves Inlet/outlet	2/2					
Injection process	Deutz Common Rail (DCR)					
Pressure in Common Rail (high-pressure accumulator)	approx. 400 … approx. 1600 bar (load-dependent)					
Engine control unit (regulator)	EDC 7 (Bosch)					
Firing sequence	1 – 5 – 3 – 6 – 2 – 4 (1 cylinder on flywheel)					
Charging	Wastegate turbocharger/intercooler					
Exhaust gas recirculation with exhaust gas cooler	External exhaust gas recirculation (ext. AGR)					
Rated power to ECE R24 (KW/PS)	140/190	154/210	176/240	199/270	220/300	243/330
Maximum rated power to ECE R24 (KW/PS)	162/220	176/240	199/270	220/300	242/330	265/360
Bore/stroke (mm)	108/130					
Cubic capacity (l)	7,2					
Idle speed (rpm)	780 +/- 30					
Rated speed (rpm)	2200					
No-load speed (rpm)	2310 – 2350					
Start of delivery	Set by the EDC, load-dependent					
Valve clearance (cold engine, max. 50 °C) Inlet/outlet (°) (Note: the valve clearance is set using an X899.980.236.030 angle gauge)	75/105					
Compression ratio	18 : 1					

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-

Tractor type	922 Vario	924 Vario	927 Vario	930 Vario	933 Vario	936 Vario
Compression pressure (bar)	20 … 30 (Note: max. permissible deviation between cylinders is 15%)					
Min. oil pressure when warm (114°C) and in low idle speed	approx. 0.8 bar					
Cold-start system	Heater flange, additional electrical engine heater (optional)					
Fuel supply (l)	660					
Water pre-cleaner in fuel system	Standard					
Technical specification extract: transmission						
Transmission type (FENDT)	ML 260					
Transmission oil (see also: fuels and lubricants in Operating Manual)	STOU 10 W 40					
Housing coupler	Block design					
Hydrostatic units: pump/engine	233 cc / 2x 233 cc					
Forward/reverse gears	stepless/stepless					
Travel ranges	I (field)/II (road)					
Min. speed	30 m/h (0.03 km/h)					
Max. speed, travel range I (forwards)	32 km/h					
Max. speed, travel range I (reverse)	20 km/h					
Max. speed, travel range II (forwards)	60 km/h (1900 rpm) / 50 km/h (1600 rpm) / 40 km/h (1300 rpm)					
Max. speed, travel range II (reverse)	38 km/h					
Shifting	Electr. joystick					
Acceleration rate I (for special applications, e.g. road grooving machine)	0.03-0.5 km/h (1x joystick touch)					
Acceleration rate II (for field work, heavy-duty traction work)	0.5 km/h (1x joystick touch)					
Acceleration rate III (for field work, heavy-duty traction work)	1.0 km/h (1x joystick touch)					
Acceleration rate IV (for road journeys)	1,0 Km/h (1x touch of joystick)					
Emergency actuation	Mechanical adjustment of A009 actuator unit					
Towing selector (Note: observe towing instruction)	Mechanical idle setting of travel range selector					
Turbo-clutch (Y004 solenoid valve)	Electro-hydraulic					

Tractor type	922 Vario	924 Vario	927 Vario	930 Vario	933 Vario	936 Vario
Clutch (4V5 pressure-limiting valve) Servo-assisted via Pentosin X902.011.622	Hydraulic					
Transmission oil cooler (transmission oil/air)	Standard					
Technical specification extract: rear axle						
Rear axle type (FENDT)	HA 260					
Transmission oil (see also: fuels and lubricants in Operating Manual)	STOU 10 W 40					
Rear wheel brake	Wet multiple-disc brake/pneumatically actuated					
Version: 40 km/h (18 t permissible overall weight) or 50 km/h (15 t permissible overall weight)	1-circuit brake + 4WD engagement (steering brake possible)					
Version: 40 Km/h o. 50 Km/h (18 t permissible overall weight) or 60 Km/h (16 t permissible. overall weight)	2-circuit brake, 4 x individual wheel brakes (steering brake not possible)					
Parking brake ("hand brake")	Pneumatic					
Rear PTO clutch	Wet multiple-disc clutch/electro-hydraulically actuated					
Rear PTO speed	**"1000" (1000 rpm)/"540E" (750 rpm) (standard)** "1000" (1000 rpm)/"540" (540 rpm) (optional) or "1000" (1000 rpm)/"1000E" (1400 rpm) (optional)					
Differential lock (Rear diff. lock/front diff. lock)	Wet multiple-disc lock/electro-hydraulically actuated/ selectable under load **Auto:** The differential lock disengages automatically at speeds higher than 20 km/h and must be re-selected below 20 km/h The differential lock automatically disengages when the steering angle is greater than 15° and re-engages below 15° The differential lock also disengages when the foot brake is depressed and re-engages when the foot brake is released **100% diff. lock**					

Tractor type	922 Vario	924 Vario	927 Vario	930 Vario	933 Vario	936 Vario
4WD clutch	Wet multiple-disc clutch/electro-hydraulically actuated/ selectable under load **Auto:** 4WD automatically disengages at speeds higher than 20 km/h and re-engages at speeds below 20 km/h 4WD is automatically disengaged when the steering angle is greater than 25°, and re-engages below 25° **100% 4WD clutch**					
Axle point 40 km/h version (18 t permissible overall weight)	Flange/stub shaft					
50 km/h version (15 t permissible overall weight)	Flange/stub shaft					
50 km/h variant (18 t permissible overall weight)	Flange/stub shaft					
60 km/h variant (16 t permissible overall weight)	Flange					
Technical specification extract: front axle						
Front axle type (FENDT)	Front axle with individual wheel suspension					
Permissible axle load	8 t					
Transmission oil (see also: fuels and lubricants in Operating Manual)	Fendt Extra Trans 10W-40					
Version with front axle brake (2-circuit brake) **(wet multiple-disc brake, pneumatically actuated)** Max. permissible drive speed	**40 Km/h und 50 Km/h(18 t permissible overall weight) / 60 Km/h (16 t permissible overall weight)**					
Version without front axle brake (1-circuit brake) (Note: With this version, the tractor is decelerated via the rear wheel brake and by engaging 4WD) Max. permissible drive speed	**40 Km/h(18 t permissible overall weight) / 50 Km/h (15 t permissible overall weight)**					
Front axle housing – transmission oil lubrication Variant: 2-circuit brake with/without front PTO	Forced feed lubrication Hydraulic pump: 16cc/r with 25 bar at pressure-limiting valve Drive transmission: 0.896 Hydraulic pump delivery rate: 17 l/min (at an engine speed of 1000 rpm) 35 l/min (at an engine speed of 2000 rpm)					

Tractor type	922 Vario	924 Vario	927 Vario	930 Vario	933 Vario	936 Vario
Variant: 1-circuit brake + 4WD engagement with front PTO	Forced feed lubrication Hydraulic pump: 8cc/r with 25 bar at pressure-limiting valve Drive transmission: 0.896 Hydraulic pump delivery rate: 9 l/min (at an engine speed of 1000 rpm) 18 l/min (at an engine speed of 2000 rpm)					
Variant: 1-circuit brake + 4WD engagement without front PTO	Injection lubrication					
Front axle suspension	Hydro-pneumatic individual wheel suspension with level control					
Suspension hydr. control block	Version 1: Hydr. control block without wobble stabiliser Version 2: Hydr. control block with wobble stabiliser					
Swing arm	Double suspension axle with -185/+115mm suspension travel (total 300 mm)					
Suspension characteristic	Characteristic switching (road, field hardness) and wobble support up to 60 km/h, speed-linked, brake dive and anti-squat compensation					
Technical specification extract: front PTO						
Speed (rpm)	1000					
Rotational direction	Clockwise in direction of travel					
Actuating the front PTO clutch	Electro/hydraulic (transmission oil from front axle housing)					
Front PTO clutch	Wet multiple disc clutch					
Technical specification extract: working and steering hydraulics						
Hydraulic oil (see also: fuels and lubricants in Operating Manual)	STOU 10 W 40					
Hydraulic oil cooler	Hydraulic oil/air					
Removable hydraulic oil volume	Approx. 87 l					
Hydraulic oil pre-heating at temperatures of below 0°C	Standard					
Small LS pump (PR) (axial piston pump, Rexroth A10 VO 63); drive transmission: 0.869	163 l/min (at an engine speed of 2200 rpm)/pressure: max. 200 bar					
Large LS pump (PR) (axial piston pump, Rexroth A10 VNO 85); drive transmission: 0.869	216 l/min (at an engine speed of 2200 rpm)/pressure: max. 200 bar					
Auxiliary pump (PH) (gear pump, Bosch 22.5cc/r); drive transmission: 0.896	55 l/min (at an engine speed of 2200 rpm)/pressure: max. 190 bar					

Tractor type	922 Vario	924 Vario	927 Vario	930 Vario	933 Vario	936 Vario
Wheel-driven emergency pump steering (PNL) (gear pump, Bosch 8 cc/r); Drive via 4WD shaft Pumping in forwards direction Short-circuit to tank on reversing	36 l/min (at 60 km/h)/pressure: max. 190 bar 6 l/min (at 10 km/h)/pressure: max. 190 bar					
Auxiliary control valve (Bosch SB 23 LS-EHS 2)	Elec. auxiliary control valve (flow: 100 l/min, optional 140 l/min – only available in position 4)					
Response behaviour of the auxiliary control valve	Adjustable on terminal (flow rate, acceleration rate, actuation time, priority, individual locking)					
Lock valves in pressure lines of auxiliary control valve	Hydraulic servo-assistance					
Auxiliary valve emergency actuation	Hand pump for opening lock valves/main actuator opened manually					
Auxiliary control valves at rear of tractor, breakaway couplings on rear of tractor (max no. of valves, only available on Profi model)	Auxiliary control valve 1.1 "yellow" (standard) Auxiliary control valve 1.2 "blue" (standard) Auxiliary control valve 1.3 "red" (standard) Auxiliary control valve 1.4 "green" (standard) Auxiliary control valve 1.5 "brown" (optional) Auxiliary control valve 1.6 "purple" (optional)					
Auxiliary control valves in centre of tractor; breakaway couplings at front on tractor (Max. no of valves, only available on Profi model)	Auxiliary control valve 2.1 "olive" (optional) Auxiliary control valve 2.2 "grey" (optional)					
External pressure connection "Power Beyond" (PB) (optional)	Pressure: max 200 bar/flow rate: max 215 l/min (theoretical output: 71.6 KW/97 PS)					
External LS pressure increase	Can be enabled and adjusted from 0–25 bar on terminal					
EPC cut-off valve, rear power lift (Bosch)	Version 1: SA cut-off valve (single-acting) Version 2: DA cut-off valve (double-acting) (Note: field pressure can be adjusted on terminal)					
Hydraulic lower link support (optional)	The lower links can be in supported on the side by hydraulic cylinders in conjunction with the lifting height. This can also be activated manually. (Note: the hydraulic lower link support can be adjusted via the terminal)					
Maximum lifting power on the rear power lift	118 KN					
EPC cut-off valve, front power lift (Bosch)	Variant 1: SA cut-off valve (single-acting) Variant 2: DA cut-off valve (double-acting) (Note: pressure force can be adjusted on A054 terminal)					
Standard front power lift (Hydac)						
Maximum lifting power on the front power lift	55.5 KN					

Tractor type	922 Vario	924 Vario	927 Vario	930 Vario	933 Vario	936 Vario
Autoguide, control block (Danfoss)	Electr. control valve (proportional)					
Reversing driver stand	Rotary feedthrough in the cab floor					
Technical specification extract: cab						
Cab construction	5 posts					
Noise level	approx. 70 db (A)					
Air conditioning system	Automatic air conditioning with stepless fan					
Reversing driver stand	Optional					
Suspension	3-point pneumatic suspension with hydr. shock absorbers and integrated level control					
Driver seat	Version 1: Fendt super deluxe seat Version 2: Fendt super deluxe seat, Maximo Evolution (MSG 97 AL/741) – Active seat air conditioning for seat cooling or heating to ensure comfortable seat climate – Active weight adjustment for fully-automatic setting and adjustment of driver weight Version 3: Fendt super deluxe seat, Maximo Evolution active (MSG 97 EAC/741) – Active seat air conditioning for seat cooling or heating to ensure comfortable seat climate – Active weight adjustment for fully-automatic setting and adjustment of driver weight – Active suspension					
Technical specification extract: electrics/electronics						

Tractor type	922 Vario	924 Vario	927 Vario	930 Vario	933 Vario	936 Vario
A039 multifunction armrest (MFA)	Operation of: – Vario transmission – Working hydraulics – Rear and front power lift – Rear and front PTO – 4WD and diff. lock – Front axle suspension – Tractor Management System (TMS) – Headland Management System (TI) – Automatic track guidance system (Auto-Guide) There are two multifunction armrests, depending on tractor type: – Power equipment (entry-level version) – Profi equipment (standard version) Note: The Power version cannot be upgraded to the Professional version.					
A007 instrument panel	Displays: – Speeds (diesel engine, rear PTO, front PTO) – Road speed (theoretical, actual (radar)) – Fill levels – Error displays – Indicator lamps					
A036 instrument panel	Operation of: – Lighting – Rear window wiper – Automatic air conditioning – Ventilation – Central information display					

Tractor type	922 Vario	924 Vario	927 Vario	930 Vario	933 Vario	936 Vario
A050 ECU, basic control unit (32-bit processor)	Contents: – Transmission – 4WD and diff. lock – Working hydraulics – Rear power lift (rear EPC) – Front power lift (standard/enhanced control) – PTO (front, rear) – Front axle suspension – Tractor Management System (TMS) – Headland management system (Teach-in "TI") – ISO bus implement control – Automatic track guidance system (Auto-Guide)					
A038 ECU, central electrical system	Contents: – Drive light – Position light – Direction indicator – Hazard lights – Brake light – Work light – Rotating beacon – Interior lighting – Windscreen wiper (front and rear) – Rear window heater – Trailer socket – Automatic air conditioning					
A051 ECU, engine control unit (EDC 7) (fuel-cooled)	Contents: – Engine control					

9 Position of sign plates

Position of sign plates

Vehicle sign plate

right side, on front axle casing

Fig. 5. I002592

Chassis number (engraved)

right side, on front axle casing

Fig. 6. I002593

Front axle sign plate

right side, on front axle casing

Fig. 7. I002594

Diesel engine sign plate

right side, on crankcase

Fig. 8. I002591

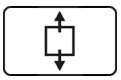
Transmission sign plate

right side on transmission housing

Fig. 9. I002596

Vario transmission insert sign plate

on top of Vario transmission insert



Remove cab, remove transmission cover

Fig. 10. I002600

Rear axle sign plate

right side, on rear axle housing

Fig. 11. I002595

Cab sign plate

in rear of cab

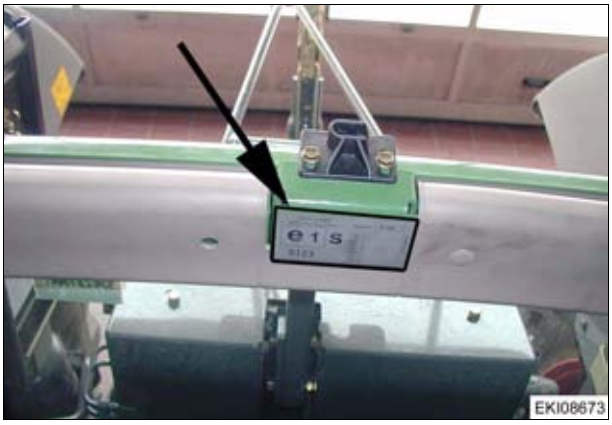


Fig. 12. I002597

Trailer frame sign plate

NOTE: *See also: Operating manual*

right side, on trailer frame

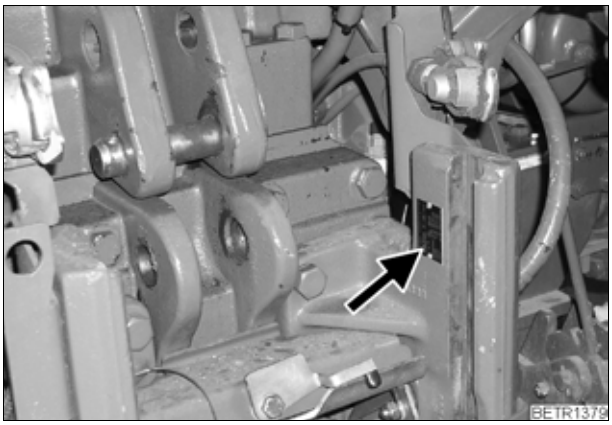


Fig. 13. I002604

Automatic trailer hitch sign plate

NOTE: *See also: Operating manual*

on trailer hitch

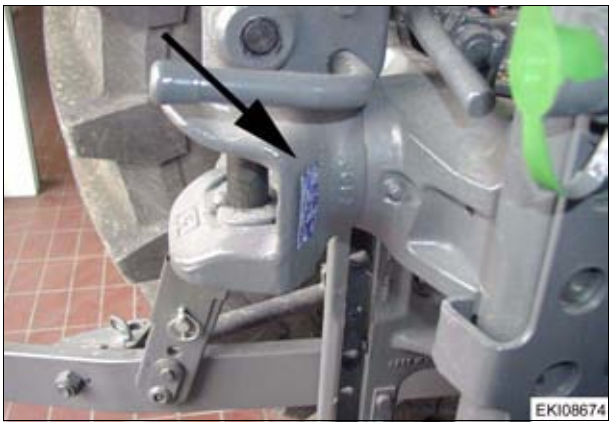


Fig. 14. I002598

Ball-type coupling (height adjustable) sign plate

NOTE: *See also: Operating manual*

on ball-type coupling

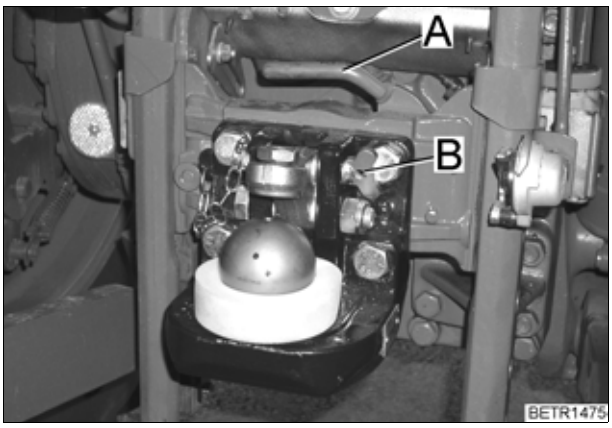


Fig. 15. I002601

Ball-type coupling sign plate

NOTE: *See also: Operating manual*

on ball-type coupling

Fig. 16. I002599

Draw bar sign plate

NOTE: *See also: Operating manual*

on draw bar

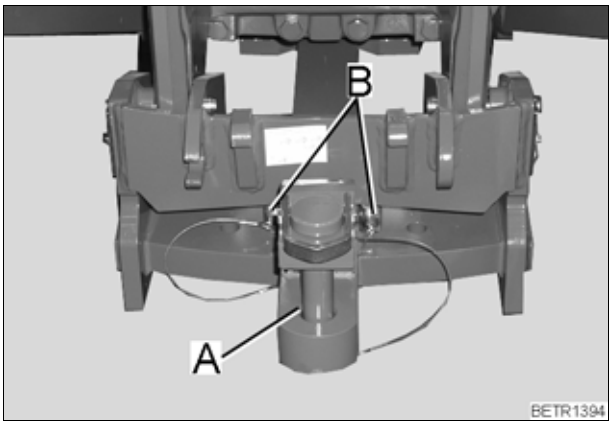


Fig. 17. I002602

Piton Fix sign plate

NOTE: *See also: Operating manual*

on Piton Fix

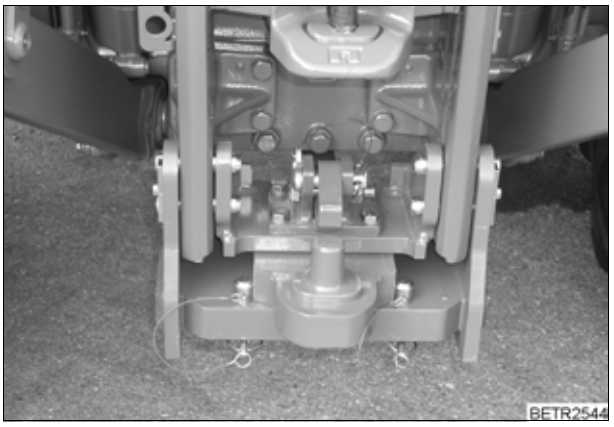


Fig. 18. I002603

Hydraulic hitch sign plate

NOTE: *See also: Operating manual*

on hydraulic hitch

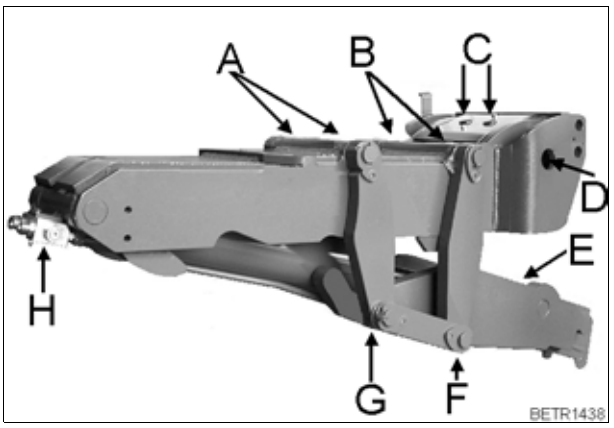


Fig. 19. I002605

10 Tractor diagnostics with terminal

Ignition on

Press F6.

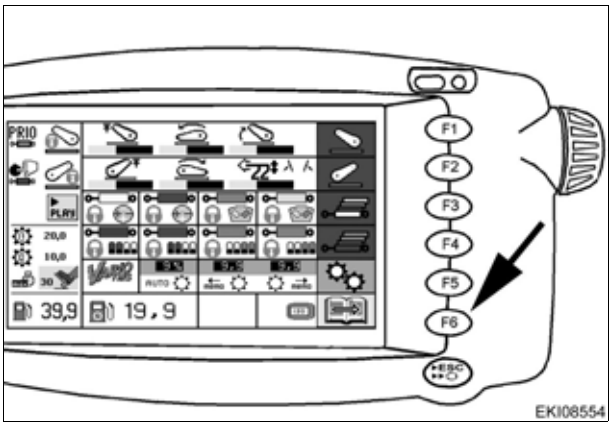


Fig. 20. I002368

The second menu level is displayed.
Press F6.

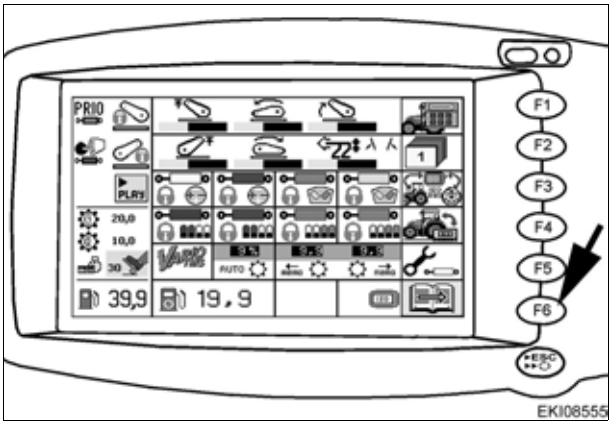


Fig. 21. I002369

The third menu level is displayed.
Press F5.

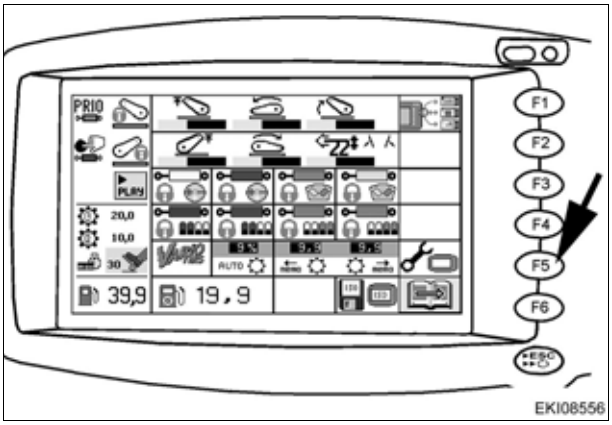


Fig. 22. I002370

The diagnostics menu is displayed.
Press F2.

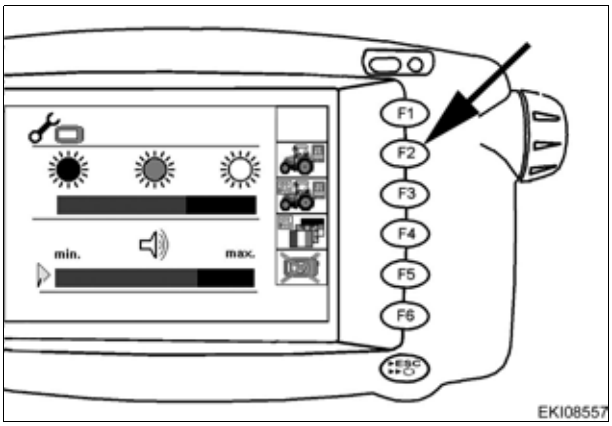


Fig. 23. I002371

Diagnose 1 (diagnostics 1) menu is displayed.

IDEAL	value specified by the A050 ECU, basic control unit
VE	Adjustment angle of the A009 transmission control unit
REAL	Transmission ratio actually set in the transmission

Forwards direction of travel:

IDEAL	0 to approx. 10,000 (max. value)
VE	0 to approx. 10,000 (max. value)
REAL	0 to approx. 10,000 (max. value)

Reverse direction of travel:

IDEAL	0 to approx. –10,000 (max. value)
VE	0 to approx. –10,000 (max. value)
REAL	0 to approx. –10,000 (max. value)

Scroll with **F3 key**

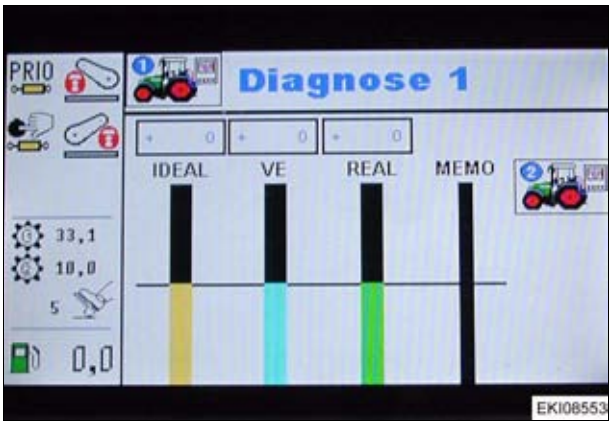


Fig. 24. I002367

Diagnose 2 (diagnostics 2) menu is displayed.

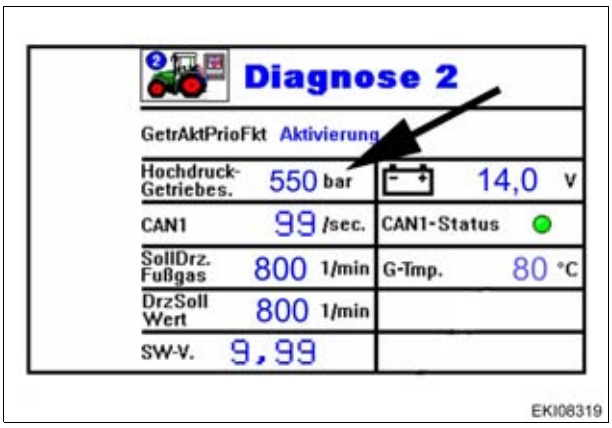


Fig. 25. I001537

Legend:

- **High-pressure transmission** sensor B008, displays oil pressure in the transmission high pressure circuit
- **Getr**iebe -**Akt**ion -**Prio**rität -**F**un**kt**ion, (transmission, action, priority, function) indicates the current control status of the transmission:
  1. Activation,
  2. Joystick,
  3. Quick reverse,
  4. Clutch,
  5. Speed selection,
  6. Load limit control,
  7. Final speed control,
  8. Hydrostatic pressure limiter,
  9. Engine stall protection,
  10. Engine overspeed protection,
  11. Cruise control,
  12. Emergency mode,
  13. Throttle pedal,
  14. None (default))
- **CAN1**: General CAN transmission messages in accordance with protocol 1 and 2; displayed as messages per second.
- **CAN1 status** - The CAN1 status is depicted in LED format; the LED is green when there are no faults.
- **Target sp**eed accelerator potentiometer **B055** displays target engine speed (rpm)
- **Temp**erature sensor discharge **B009**, shows discharge temperature from the transmission high pressure circuit. Temperature values below 50°C are displayed as **"Temp. < 50°C"**. Temperature values above 50°C are displayed correctly.
- **Speed target value** shows speed target value of the engine (rpm)
- **S**oft**w**are **v**ersion displays the software version of the terminal.

Press **F3** to return to **Diagnostics 1** menu.

NOTE: *The diagnostics terminal is no substitute for transmission pressure measurements or electrical readings; it only provides a reference value for the Vario transmission functions and the status of the CAN system.*

Possible applications:

– Tractor - loss of power
(Question: transmission or engine?).

– Transmission is overheating
(Question: how high is the transmission discharge temperature for various tasks?).

– Checking the target engine speed

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

B

Faults

B Faults

1 Confirming, calling up, deleting fault codes 41
2 Fault code 00.0.00 - 43
3 Fault code 01.1.00 - 46
4 Fault code 02.1.00 - 49
5 Fault code 03.1.00 - 50
6 Fault code 04.1.00 - 51
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9 Fault code 07.1.00 - 68
10 Fault code 08.1.00 - 70
11 Fault code 09.1.00 - 74
12 Fault code 0A.1.00 - 77
13 Fault code 0B.1.00 - 90
14 Fault code 0D.1.00 - 92
15 Fault code 0F.1.00 - 96
16 Fault code 10.1.00 - 100
17 Fault code 15.1.00 - 101
18 Fault code 18.1.00 - 103
19 Fault code 1E.1.00 - 106
20 Calibration fault codes 114

1 Confirming, calling up, deleting fault codes

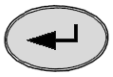
Confirm fault code

Cancelling a fault code does not remove the fault; it is simply no longer displayed.

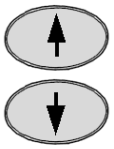
Press button repeatedly until no more fault codes are indicated on the display.

NOTE: *Each stored fault code must be cleared individually.*
The message will be displayed again the next time the tractor is started up.

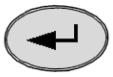
Call up fault code



Press button, the first main menu level appears on the multiple display.



Press one of the buttons repeatedly until the symbol (A) flashes.



Press button, the following image appears on the multiple display:

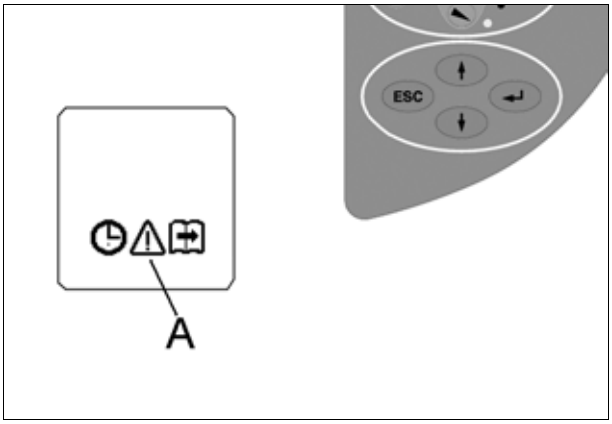
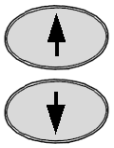


Fig. 1. I008552

A Number of faults
B Fault currently on display
C Fault code



Press one of the buttons and the faults are displayed one after the other along with their fault code.

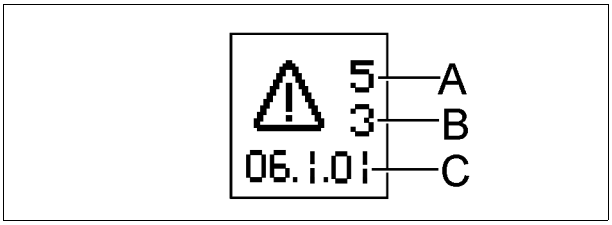
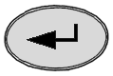


Fig. 2. I000441

Delete fault code

First call up the fault code, making a note of it if necessary.



Press button, the following image appears on the multiple display:

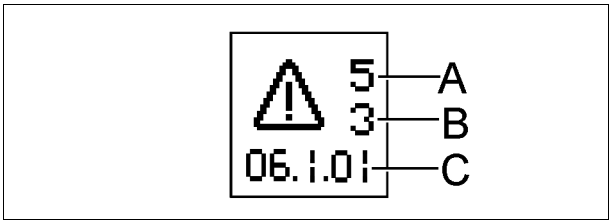


Fig. 3. I000441

Press buttons A, B and C simultaneously.
All fault codes in the fault memory of
A007 - Instrument panel are deleted.

NOTE: *Fault codes are also stored in the* ***A050*** *- ECU, basic control unit and, where necessary, in the* ***A051*** *- ECU, engine control unit (EDC 7)..*

Fault codes can only be deleted from the A050 and A051 using the corresponding diagnostic software.

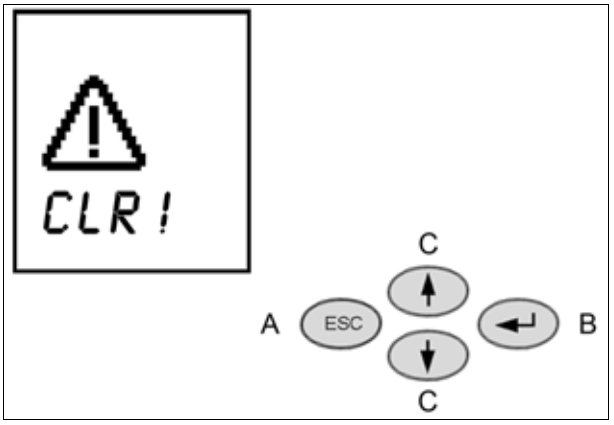


Fig. 4. I008550

2 Fault code 00.0.00 -

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
00.0.01	**A050** - ECU, basic control unit	Bus fault EDC, no speed setting to EDC	Engine malfunction		EOL programming
00.0.02	**A073** - Terminal (A4)	Terminal bus fault, does not report to bus			EOL programming
00.0.03	**A039** - MFA, multifunction armrest	Multifunction armrest bus fault, does not report to bus			EOL programming
00.0.04	**A050** - ECU, basic control unit	Transmission bus fault, no setpoint value to actuator unit	Functions non-operational, no display		EOL programming
00.0.05	**A050** - ECU, basic control unit	Bus fault AR/Diff.	Functions non-operational, no display		EOL programming
00.0.06	**A050** - ECU, basic control unit	Rear PTO bus fault	Functions non-operational, no display		EOL programming
00.0.07	**A050** - ECU, basic control unit	Front PTO bus fault	Function non-operable, no display		EOL programming
00.0.08	**A050** - ECU, basic control unit	Bus fault, rear EPC	Function non-operable, no display		EOL programming
00.0.09	**A050** - ECU, basic control unit	Bus fault, front EPC			EOL programming
00.0.0A	**A050** - ECU, basic control unit	Bus fault, el. Valves			EOL programming
00.0.0B	**A050** - ECU, basic control unit	Bus fault, teach-in function			EOL programming
00.0.0F	**A038** - ECU, central electrical system	Bus fault, central electrical system			EOL programming
00.0.10	**A050** - ECU, basic control unit	Bus fault, air conditioning system			EOL programming
00.0.15	**A050** - ECU, basic control unit	Bus fault, VA suspension	Function non-operable, no display		EOL programming
00.0.16	**A050** - ECU, basic control unit	EPC CAN bus fault Auto mode	Function non-operable, no display		EOL programming

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

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
00.0.17	**A050** - ECU, basic control unit	Bus fault, Vario control unit			EOL programming
00.0.18	**A050** - ECU, basic control unit	Bus fault, electro-hydraulic steering (EHL)			EOL programming
00.0.19	**A050** - ECU, basic control unit	Bus fault, ISO task			EOL programming
00.0.1E	**A050** - ECU, basic control unit	Bus fault, EDC7 reports incorrectly to instrument panel			EOL programming
00.0.1F	**A050** - ECU, basic control unit	Bus fault, fault management			EOL programming
00.1.4D	**A007** - Instrument panel	Checksum Menu images, instrument panel memory faulty	Display fault in instrument panel		EOL programming
00.1.4E	**A007** - Instrument panel	Checksum Warning images, instrument panel memory faulty	Display fault in instrument panel		EOL programming
00.1.4F	**A007** - Instrument panel	Checksum GD table	Display fault in instrument panel		EOL programming
00.1.50	**A007** - Instrument panel	VDO instrument panel EEPROM not programmed	Malfunctions in instrument panel		EOL programming
00.1.54	**B060** - Compressed air supply sensor	Sensor faulty Signal fault	Function non-operable Compressed air display	Circuit diagram Instrument panel/ABS/operator's seat	
		12 V supply fault	A007 - instrument panel		
00.1.55	**B084** - Sensor, hydraulic oil level	Sensor faulty Signal fault			
00.1.59	**B034** - Immersed tube sensor (fuel)	Sensor faulty, Signal fault	No display	Circuit diagram Instrument panel/ABS/operator's seat	
00.1.5A	**B019** - Sensor, compressed air supply	Sensor faulty Signal fault	Function non-operable Compressed air display	Circuit diagram Instrument panel/ABS/operator's seat	
		12 V supply fault	A007 - instrument panel		

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
00.1.71	**A036** - Control panel, dashboard right/left	Enter button	Button non-operable		
00.1.72	**A036** - Control panel, dashboard right/left	ESC button	Button non-operable		
00.1.73	**A036** - Control panel, dashboard right/left	Up button	Button non-operable		
00.1.74	**A036** - Control panel, dashboard right/left	Down button	Button non-operable		
00.1.75	**A036** - Control panel, dashboard right/left	Enter button pressed > 30s actuated	Button non-operable or button released		
00.1.76	**A036** - Control panel, dashboard right/left	Esc button pressed > 30s	Button non-operable or button released		
00.1.77	**A036** - Control panel, dashboard right/left	Up button pressed > 30s	Button non-operable or button released		
00.1.78	**A036** - Control panel, dashboard right/left	Down button pressed > 30s actuated	Button non-operable or button released		
00.1.A8	**B060** - Compressed air supply sensor	Compressed air supply 1, vacuum	On tractors with a 2-circuit brake system, below 4,6 bar the 4WD is permanently activated	Circuit diagram Instrument panel/ABS/operator's seat	
00.1.AA	**B019** - Sensor, compressed air supply	Compressed air supply 2, vacuum	On tractors with a 2-circuit brake system, below 4,6 bar the 4WD is permanently activated	Circuit diagram Instrument panel/ABS/operator's seat	

3 Fault code 01.1.00 -

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
01.1.01	**B055** - Sensor, foot throttle	Signal too high, Signal to low, No signal for longer than 2000 ms	TMS is switched off	Circuit diagram EDC engine control	
01.1.03	**B055** - Sensor, foot throttle	(red side) to A050 ECU, basic control unit (yellow side) to A051 ECU, engine No concordance		Circuit diagram EDC engine control Calibration code "4005"	
01.1.04	**A050** - ECU, basic control unit	Checksum error TMS	No TMS drive possible		EOL programming
01.1.06	**A050** - ECU, basic control unit	Memory in EXT could not be reserved, EXT fault	TMS non-operable		
01.1.07	**A051** - ECU, engine control unit (EDC 7).	Checksum Incorrect engine parameters	Travel in emergency mode possible		EOL programming
01.1.30	**A077** - Immobiliser ECU **B083** - Immobiliser control	No ignition key taught in	Start not possible	Teach in vehicle key	
01.1.31	**A077** - Immobiliser ECU **B083** - Immobiliser control	Invalid transponder data from ignition key	Cannot start with this key	Use taught-in key	
01.1.32	**A077** - Immobiliser ECU **B083** - Immobiliser control	Ignition key without transponder recognised	Cannot start with this key	Use taught-in key	
01.1.34	**A077** - Immobiliser ECU **B083** - Immobiliser control	No response from immobiliser control			
01.1.35	**A077** - Immobiliser ECU **B083** - Immobiliser control	Immobiliser control is in "ready for teach-in" mode, A051 (EDC) is not			
01.1.36	**A051** - ECU, engine control unit (EDC 7). **A077** - Immobiliser ECU **B083** - Immobiliser control	No immobilisation communication exchange with A051 (EDC)			
01.1.37	**A051** - ECU, engine control unit (EDC 7). **A077** - Immobiliser ECU **B083** - Immobiliser control	Performance curve not sent to A051 (EDC)			
01.1.38	**A077** - Immobiliser ECU **B083** - Immobiliser control	Performance curve not available		New activation	EOL programming
01.1.39	**A077** - Immobiliser ECU **B083** - Immobiliser control	Equipment data not available		New activation	EOL programming

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
01.1.3A	**A077** - Immobiliser ECU **U001** - Immobiliser aerial	Aerial faulty, signal line faulty			
01.1.3B	**A051** - ECU, engine control unit (EDC 7). **A077** - Immobiliser ECU **B083** - Immobiliser control	Vehicle serial number not the same in A051 and A077 or B083			
01.1.3C	**A050** - ECU, basic control unit **A077** - Immobiliser ECU **B083** - Immobiliser control	No immobilisation communication exchange or vehicle serial number not the same	Engine cuts out, transmission cannot be activated		EOL programming
01.1.3D	**A050** - ECU, basic control unit **A077** - Immobiliser ECU **B083** - Immobiliser control	Status message details cannot be called up	Engine cuts out, transmission cannot be activated		EOL programming
01.1.3E	**A050** - ECU, basic control unit **A077** - Immobiliser ECU **B083** - Immobiliser control	A050 equipment features cannot be read	Speed governor and 4WD engage when braking	New activation	EOL programming
01.1.3F	**A050** - ECU, basic control unit **A077** - Immobiliser ECU **B083** - Immobiliser control	A050 equipment features do not match	Speed governor and 4WD engage when braking	New activation	EOL programming
01.1.7A	**A039** - MFA, multifunction armrest Cruise control button MIN (on joystick)	Electrical fault	TMS is switched off		
01.1.7B	**A039** - MFA, multifunction armrest Cruise control button MAX (on joystick)	Electrical fault	TMS is switched off		
01.1.7C	**A039** - MFA, multifunction armrest TMS button	Electrical fault	TMS is switched off		
01.1.7E	**A039** - MFA, multifunction armrest Potentiometer, hand throttle	Electrical fault			
01.1.9A	**A039** - MFA, multifunction armrest	Communication fault with cruise control button MIN	TMS is switched off	CAN bus	
01.1.9B	**A039** - MFA, multifunction armrest	Communication fault with cruise control button MAX	TMS is switched off	CAN bus	
01.1.9C	**A039** - MFA, multifunction armrest	Communication fault with TMS button	TMS is switched off	CAN bus	
01.1.9E	**A039** - MFA, multifunction armrest	Communication error to hand throttle potentiometer			
01.1.A0	**A051** - ECU, engine control unit (EDC 7).	Engine type does not match entered tractor type	Torque reduction	Circuit diagram EDC engine control	SERDIA diagnostics

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
01.1.A1	**A050** - ECU, basic control unit **A051** - ECU, engine control unit (EDC 7).	CAN connection fault EDC fails to report	Engine does not start	Circuit diagram CAN bus/EDC engine control	SERDIA diagnostics
01.1.B0	**A050** - ECU, basic control unit **A051** - ECU, engine control unit (EDC 7).	CAN bus communication restricted	restricted Engine function	Circuit diagram CAN bus/EDC engine control	EOL programming
01.1.E0	**A050** - ECU, basic control unit	EEPROM: Checksum incorrect for hand throttle	Hand throttle not working	Calibration code "4002"	
01.1.F1	**A051** - ECU, engine control unit (EDC 7).	Power reduction in EDC			
01.1.F2	**A051** - ECU, engine control unit (EDC 7).	Manipulation protection message not available			
01.2.C0	**A039** - MFA, multifunction armrest Seat switch	Warning message "Seat switch with active TMS"			

4 Fault code 02.1.00 -

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
02.1.E0	**A050** - ECU, basic control unit **A039** - MFA, multifunction armrest	Faulty CAN communication between e-box and CAN joystick			
02.1.EE	**A050** - ECU, basic control unit	Error message on ISO job computer,			
02.1.EF	**A050** - ECU, basic control unit	Internal tractor GD error message			EOL programming

5 Fault code 03.1.00 -

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
03.1.00	**A039** - MFA, multifunction armrest	unknown MFA fault			
03.1.01	**A039** - MFA, multifunction armrest	Faulty hardware (e.g. RAM without flash)	Function non-operable		EOL programming
03.1.02	**A039** - MFA, multifunction armrest	Incorrect checksum for the first 128 bytes in the EEPROM	Function non-operable		EOL programming
03.1.03	**A039** - MFA, multifunction armrest	Software error	Function non-operable		EOL programming
03.1.08	**A039** - MFA, multifunction armrest	Invalid parameters for flashing in EEPROM			EOL programming
03.1.09	**A039** - MFA, multifunction armrest	Invalid parameters for brightness setting in the EEPROM			EOL programming
03.1.18	**A039** - MFA, multifunction armrest	Invalid parameters for acceleration rate	Uses predefined values	Calibration code "4010"	EOL programming
03.1.20	**A039** - MFA, multifunction armrest	Invalid parameter for crossgate lever	Uses predefined values	Calibration code "1001"	EOL programming
03.1.30	**A039** - MFA, multifunction armrest	Invalid parameters for linear module (valve rockers)	Uses predefined values	Calibration code "1003"	EOL programming
03.1.40	**A039** - MFA, multifunction armrest	Invalid parameters for hand throttle and throttle pedal speed range	Uses predefined values	Calibration code "4010"	EOL programming
03.1.50	**A039** - MFA, multifunction armrest	Invalid parameters for FRONT power lift module	Uses predefined values	Calibration code "9001"	EOL programming
03.1.60	**A039** - MFA, multifunction armrest	Invalid parameters for REAR power lift module	Uses predefined values	Calibration code "8001"	EOL programming
03.1.7F	**A039** - MFA, multifunction armrest	MFA system fault			

6 Fault code 04.1.00 -

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
04.1.04	**B017** - Sensor, clutch pedal	Sensor faulty, Signal fault	Loss of enhanced control/function in final speed control; No cruise control function, TMS is switched off	Circuit diagram Transmission control system	
		Faulty 8.5 V supply	A013, fuse 05		
04.1.05	**B039** - Sensor, high-pressure 2	Sensor faulty, Signal fault	TMS is switched off	Circuit diagram Transmission control system	
		12 V supply fault	A013, fuse 31		
04.1.06	**B055** - Sensor, foot throttle	Sensor faulty, Signal fault	Emergency mode if throttle pedal mode is active, TMS is switched off	Circuit diagram EDC engine control	
		Faulty 8.5 V supply	A013, fuse 19		
04.1.07	**B008** - Sensor, high-pressure 1	Sensor faulty, Signal fault	Peak loads in the transmission are no longer monitored, TMS is switched off	Circuit diagram Transmission control system	
		12 V supply fault	A013, fuse 32		
04.1.08	**B016** - Sensor, travel range detection	Sensor faulty, Signal fault	TMS is switched off	Circuit diagram Transmission control system	
		Faulty 8.5 V supply	A013, fuse 08		
04.1.19	**A050** - ECU, basic control unit	Error on reading-in throttle pedal parameters			
04.1.20	**A039** - MFA, multifunction armrest	EEPROM checksum incorrect or not calibrated	Throttle pedal mode not possible, TMS is switched off	Calibration code "4010"	
04.1.21	**S045** - Switch, reversing driver stand	Faulty switch, Signal fault		Circuit diagram Transmission control system	

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
04.1.22	**A039** - MFA, multifunction armrest	Throttle pedal resolution potentiometer faulty, Signal fault	TMS is switched off		
04.1.23	**A039** - MFA, multifunction armrest	Joystick signal "Tempomat cruise control ON" faulty	Continuation in emergency mode possible	Circuit diagram Transmission control system	
04.1.24	**S080** - Switch, hand brake	Faulty switch, Signal fault	Hand brake auto mode not available	Circuit diagram Transmission control system	
04.1.25	**A039** - MFA, multifunction armrest	Joystick signal "F/R quick reverse" faulty	TMS is switched off		
04.1.26	**A039** - MFA, multifunction armrest	Accelerator pedal mode button faulty, Signal fault	Throttle pedal mode inoperable		
04.1.28	**A009** - Actuator unit VR incremental encoder	Faulty path signal	Continuation in emergency mode possible	Circuit diagram Transmission control system	
04.1.29	**A039** - MFA, multifunction armrest	Joystick signal "park position" faulty	TMS is switched off		
04.1.2A	**B015** - Sensor, bevel pinion	Sensor faulty, Direction signal faulty	Continuation in emergency mode possible	Circuit diagram Transmission control system	
04.1.2B	**A039** - MFA, multifunction armrest Button, travel range selection I/II	Faulty button, Signal fault			
04.1.2C	**A039** - MFA, multifunction armrest Neutral/Active Stationary button	Faulty button, Signal fault	Continuation in emergency mode possible		
04.1.2D	**S079** - Switch, steering column "Quick reverse" button on control stalk	Faulty forward travel signal	TMS is switched off	Circuit diagram Transmission control system	
04.1.2E	**S079** - Switch, steering column "Quick reverse" button on control stalk	Faulty reverse travel signal	TMS is switched off	Circuit diagram Transmission control system	
04.1.2F	**A039** - MFA, multifunction armrest Joystick	Faulty joystick signal "v-" (joystick back)	Continuation in emergency mode possible	Circuit diagram	

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
04.1.31	**B014** - Sensor, collecting shaft	Sensor faulty, Direction signal faulty	Continuation in emergency mode possible	Circuit diagram Transmission control system	
04.1.32	**A039** - MFA, multifunction armrest Joystick activation button	Faulty button, signal fault	Continuation in emergency mode possible	Circuit diagram	
04.1.33	**A039** - MFA, multifunction armrest	Faulty joystick signal "v+" (joystick forward)	Continuation in emergency mode possible	Circuit diagram	
04.1.40	**B016** - Sensor, travel range detection	Transmission travel range is not recognised correctly		Calibration code "4003"	
04.1.42	**B014** - Sensor, collecting shaft	Sensor faulty, Speed signal faulty	Continuation in emergency mode possible	Circuit diagram Transmission control system	
		Faulty 8.5 V supply	A013, fuse 07		
04.1.44	**B010** - Sensor, engine speed	Sensor faulty, Signal fault	Continuation in emergency mode possible	Circuit diagram Transmission control system	
		12 V supply fault	A013, fuse 33		
04.1.45	**B015** - Sensor, bevel pinion (=travel speed)	Sensor faulty, Speed signal faulty	Continuation in emergency mode possible	Circuit diagram Transmission control system	
		Faulty 8.5 V supply	A013, fuse 08		
04.1.46	**Y004** - Solenoid valve, turbo-clutch	Pressure does not drop when the TK valve is opened	TK valve jams, TK valve external energising		
04.1.47	**B016** - Sensor, travel range detection **Y002** - Solenoid valve, travel range I **Y003** - Solenoid valve, travel range II	Travel range selector: Does not come out of gear when travel range valve is energised	Travel range detection sensor faulty, incorrect valve connected or valve is faulty		
04.1.48	**B016** - Sensor, travel range detection **Y002** - Solenoid valve, travel range I **Y003** - Solenoid valve, travel range II	Travel range selector: Cannot shift to neutral	Travel range detection sensor faulty, incorrect valve connected or valve is faulty		
04.1.50	**S017** - Filter contamination switch	Filter clogged	No further indication of clogging	Circuit diagram Transmission control system	Switch function not active at oil temperature below 50°
04.1.51	**B009** - Discharge temperature sensor	"Transmission oil temperature over 95°".	Switching from travel range 2 to travel range 1		

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
04.1.52	**B009** - Discharge temperature sensor	"Transmission oil temperature over 105°".	Continuing to drive will cause transmission damage		
04.1.53	**B009** - Discharge temperature sensor	"Transmission oil temperature more than 110°C"	transmission damage if journey is continued!	Circuit diagram Transmission control system	
04.1.56	**S017** - Filter contamination switch	Faulty switch, Signal line fault		Circuit diagram Transmission control system	
04.1.58	**A050** - ECU, basic control unit **A009** - Actuator unit **B014** - Sensor, collecting shaft **B015** - Sensor, bevel pinion **B016** - Sensor, travel range detection	Transmission slip monitor Transmission output speed deviates by more than 30% from set-point value	May occur at extremely low temperatures in isolated cases; repeated occurrence under normal conditions causes a rise in oil temperature and further transmission damage; TMS is switched off	Fault not active if turbo-clutch (TK) function is on - clutch is depressed, check clutch from actuator unit	("Ideal ratio/actual ratio" comparison)
04.1.59	**A050** - ECU, basic control unit **S013** - Emergency mode button	Emergency operation activated manually/electronic emergency operation actuation faulty	TMS is switched off		
04.1.61	**A050** - ECU, basic control unit **Y002** - Solenoid valve, travel range I	Faulty valve actuation, travel range I	Cannot switch to travel range I	Circuit diagram Transmission control system	
04.1.62	**A050** - ECU, basic control unit **Y003** - Solenoid valve, travel range II	Faulty valve actuation, travel range II	Cannot switch to travel range II	Circuit diagram Transmission control system	
04.1.63	**A050** - ECU, basic control unit **Y005** - Solenoid valve, speed governor	Valve actuation for mechanical speed limiter faulty		Circuit diagram Transmission control system	
04.1.64	**A050** - ECU, basic control unit **Y004** - Solenoid valve, turbo-clutch	Faulty solenoid valve actuation, turbo-clutch	TK valve cannot be actuated manually, i.e. tractor must not be driven!	Circuit diagram Transmission control system	
04.1.65	**A050** - ECU, basic control unit **Y053** - Active hold function solenoid valve	Actuation of earth side of solenoid valve faulty	Fault on earth side to solenoid valve	Circuit diagram Transmission control system	

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
04.1.66	**A050** - ECU, basic control unit **Y053** - Active hold function solenoid valve	Actuation of + side of solenoid valve faulty	Fault on + side to solenoid valve	Circuit diagram Transmission control system	
04.1.67	**A050** - ECU, basic control unit **Y053** - Active hold function solenoid valve	Self-test on brake stationary function failed	Check electrical circuit	Circuit diagram Transmission control system	
04.1.68	**A050** - ECU, basic control unit **Y053** - Active hold function solenoid valve	Faulty residual current, high to low side brake stationary function	External power source present	Circuit diagram Transmission control system	
04.1.70	**A039** - MFA, multifunction armrest Cruise control button, C1	Faulty button, Signal fault	Tempomat cruise control 1 cannot be activated		
04.1.71	**A039** - MFA, multifunction armrest Cruise control button, C2	Faulty button, Signal fault	Tempomat cruise control 2 cannot be activated		
04.1.76	**S047** - Switch, engine brake	Faulty switch, Signal fault	TMS is switched off	Circuit diagram EDC engine control	
04.1.77	**A039** - MFA, multifunction armrest Joystick acceleration rate I…IV	Signal fault	Only rate III available in emergency mode		
04.1.78	**A039** - MFA, multifunction armrest Seat switch	Faulty switch, Signal fault	TMS is switched off		
04.1.79	**A050** - ECU, basic control unit	Output for reverse warning signal not OK (Current > 2500 mA or short circuit)			
04.1.82	**B014** - Sensor, collecting shaft **B015** - Sensor, bevel pinion **B016** - Sensor, travel range detection	Plausibility error (=speeds do not match) fault output as of 5 km/h	Continuation in emergency mode possible	Circuit diagram Transmission control system	
04.1.83	**B014** - Sensor, collecting shaft **B015** - Sensor, bevel pinion	Plausibility error (=speeds do not match) Fault initially reported from 5 km/h	Continuation in emergency mode possible	Circuit diagram Transmission control system	
04.1.84	**A039** - MFA, multifunction armrest Joystick switch (V, R, VR, cruise control, default position)	Plausibility error (=signals do not match)	Continuation in emergency mode possible		

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
04.1.85	**B010** - Sensor, engine speed	Engine speed sensor does not supply plausible speed curves. Output speed increase or decrease is outside limits.	Continuation in emergency mode possible	Circuit diagram Transmission control system	
04.1.86	**B008** - Sensor, high-pressure 1 **B039** - Sensor, high-pressure 2	Plausibility error in both pressure sensors	TMS is switched off	Circuit diagram Transmission control system	
04.1.87	**S079** - Switch, steering column	Plausibility error at F/R switch, quick reverse	F/R switch inoperable, quick reverse on steering wheel adjustment, S079 switch,	Check quick reverse Chapter 9000 Reg. E	
04.1.89	**B009** - Discharge temperature sensor	Plausibility error, transmission temperature		Circuit diagram Transmission control system	
04.1.8B	**B014** - Sensor, collecting shaft **B015** - Sensor, bevel pinion	Plausibility error, stationary control hydrostatic pulse	Stationary control off until next key reset		EOL programming 7.63, version 04/09 or later
04.1.8C	**B014** - Sensor, collecting shaft **B015** - Sensor, bevel pinion	Plausibility error, stationary control hydrostatic direction	Stationary control off until next key reset		EOL programming 7.63, version 04/09 or later
04.1.8F		Currently selected tyre circumference is too small	- The speed display is no longer correct in certain circumstances - Transmission controls no longer working correctly in certain circumstances (e.g. TMS, final speed control, cruise control)		Enter larger tyre circumference
04.1.94	**A039** - MFA, multifunction armrest **A050** - ECU, basic control unit	Faulty CAN communication between e-box and CAN joystick			
04.1.A1	**A009** - Actuator unit	Turn angle is not reached within 2 seconds.	Continuation in emergency mode possible	Mechanical check: check smooth adjustment action in emergency mode. Refer to Service Information 26/04	

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
04.1.A2	**A009** - Actuator unit **A050** - ECU, basic control unit	CAN bus actuation fault	Continuation in emergency mode possible	Check CAN bus Chapter 9000 Reg. E	
04.1.A3	**A009** - Actuator unit	Fault or logic error in incremental sensor signal (actual position signal)	Continuation in emergency mode possible	Circuit diagram Transmission control system	
04.1.A4	**A009** - Actuator unit	Fault or logical error in EST signal.	Continuation in emergency mode possible	Circuit diagram Transmission control system	
04.1.A5	**A009** - Actuator unit	Initial reference (=zero position) could not be found during ignition ON	Continuation in emergency mode possible	Circuit diagram Transmission control system	
04.1.A6	**A009** - Actuator unit	Reference point signal fault during operation	Continuation in emergency mode possible	Circuit diagram Transmission control system	
04.1.B0	All bus users	Initialisation error TeachIn fault	Restricted CAN bus data communication	Check CAN bus Chapter 9000 Reg. E	
04.1.B1	**A050** - ECU, basic control unit	Fatal error, range change (e.g. valve fault) TeachIn fault	Emergency mode		
04.1.B2	**A050** - ECU, basic control unit	Fault in EPROM programming (travel range selector I/II)	Range cannot be changed while driving.		EOL programming
04.1.B3	**A050** - ECU, basic control unit	Fault in EPROM programming (quick reverse rate parameters)	Quick reversing possible with standard values.		EOL programming
04.1.B5	**A050** - ECU, basic control unit	Checksum error rate parameters, quick reverse for Tractor Management System (TMS)	TMS is switched off		EOL programming
04.1.B7	**B009** - Discharge temperature sensor	Incorrect checksum			EOL programming
04.1.CB	**A039** - MFA, multifunction armrest	Warning message: Travel range button "under excessive pressure"			
04.1.CF	**A050** - ECU, basic control unit	Internal error, A050 basic operating system			
04.1.D0	**A050** - ECU, basic control unit	Workshop mode: Ratio restriction active			

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
04.1.E0	**A050** - ECU, basic control unit **Y004** - Solenoid valve, turbo-clutch	Turbo-clutch characteristic read incorrectly	Continuation in emergency mode possible		EOL programming
04.1.E1	**A050** - ECU, basic control unit	Traction control regulator parameters (ML transmission adjustment) not plausible or read incorrectly	Emergency mode		EOL programming
04.1.E2	**A050** - ECU, basic control unit	Traction control regulator parameters not plausible (B008/B039) or read incorrectly.	Emergency mode		EOL programming
04.1.E3	**A050** - ECU, basic control unit	Checksum error, parameter for throttle pedal mode	Emergency mode TMS is switched off		EOL programming
04.1.E4	**A050** - ECU, basic control unit	Checksum error, electronic cardan brake parameters			EOL programming
04.1.E5	**A050** - ECU, basic control unit	Checksum error for range control, speed limiting valve etc. faulty	Range control not possible		EOL programming
04.1.E6	**A050** - ECU, basic control unit	Incorrect checksum, load limit control parameters	Emergency mode, transmission		EOL programming
04.1.E7	**A050** - ECU, basic control unit	Incorrect checksum, joystick parameters	Possible to drive with default values		EOL programming
04.1.E9	**A050** - ECU, basic control unit	Speed selection parameters incorrect			EOL programming
04.1.EA	**A050** - ECU, basic control unit	Error in checksum parameter for transmission teeth number	Continuation in emergency mode possible		EOL programming
04.1.EB	**B016** - Sensor, travel range detection	Checksum error or range control calibration missing		Calibration code "4003"	
04.1.EC	**B055** - Sensor, foot throttle	No calibration or drifted, changed values	Continuation in emergency mode possible	Calibration code "4005"	
04.1.ED	**B017** - Sensor, clutch pedal	No calibration or drifted, changed values	Continuation in emergency mode possible	Calibration code "4001"	
04.1.EE	**A050** - ECU, basic control unit Transmission characteristic	No calibration or drifted, changed values	Continuation in emergency mode possible	Calibration code "4007"	
04.1.EF	**A050** - ECU, basic control unit Turbo-clutch characteristic	No calibration or drifted, changed values	Continuation in emergency mode possible	Calibration code "4009"	

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
04.1.F0	**A050** - ECU, basic control unit	Checksum parameter for transmission calibration incorrect	Transmission cannot be calibrated		EOL programming
04.1.F1	**A050** - ECU, basic control unit	Checksum parameter for stationary control incorrect	Emergency mode		EOL programming
04.1.F2	**A050** - ECU, basic control unit	Characteristic offset deviation outside permitted range	Only fault code display		

7 Fault code 05.1.00 -

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
05.1.00	**A050** - ECU, basic control unit	EEPROM fault in basic control unit			EOL programming
05.1.31	**A039** - MFA, multifunction armrest 4WD 100% button	Faulty button, Signal fault			
05.1.32	**A039** - MFA, multifunction armrest Auto 4WD button	Faulty button, Signal fault			
05.1.33	**Y009** - Solenoid valve, 4WD	Actuation fault	4WD engages	Circuit diagram Transmission control system	
05.1.34	**B067** - Sensor, steering angle	Sensor faulty, Signal fault		Circuit diagram Suspension/Auto-Guide	
		Faulty 8.5 V supply	A013, fuse 16		
05.1.51	**A039** - MFA, multifunction armrest Differential lock 100% button	Faulty button, Signal fault	Other functions remain active		
		Faulty bus			
05.1.52	**A039** - MFA, multifunction armrest Differential lock auto system button	Faulty button, Signal fault			
05.1.53	**Y010** - Solenoid valve, differential lock	Actuation fault	Differential lock disen-gages	Circuit diagram Transmission control system	
05.1.54	**S006** - Switch, left brake	Faulty switch, Signal fault	TMS is switched off	Circuit diagram Transmission control system	
05.1.55	**S005** - Switch, right brake	Faulty switch, Signal fault	TMS is switched off	Circuit diagram Transmission control system	
05.1.56	**A050** - ECU, basic control unit	Checksum error, 4WD/differential lock parameters	No auto mode possible		EOL programming
05.1.57	**A050** - ECU, basic control unit	Checksum error, calibration data	No auto mode possible		EOL programming
05.1.58	**S087** - Switch, brake wearing, left	Faulty switch, Signal fault		Circuit diagram trailer brake	

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
05.1.59	**S086** - Switch, brake wearing, right	Faulty switch, Signal fault		Circuit diagram trailer brake	
05.1.5A	**S087** - Switch, brake wearing, left	Brake pad worn		Circuit diagram trailer brake	
05.1.5B	**S086** - Switch, brake wearing, right	Brake pad worn		Circuit diagram trailer brake	
05.1.8D	**A050** - ECU, basic control unit	Checksum error, old auto config data			EOL programming
05.1.8F	**A050** - ECU, basic control unit	Checksum error, old auto mode sequence data			EOL programming
05.1.91	**A039** - MFA, multifunction armrest Button, rear auto mode	Faulty button, Signal fault			
05.1.93	**A039** - MFA, multifunction armrest Button, front auto mode	Faulty button, Signal fault			
05.1.95	**A039** - MFA, multifunction armrest Button, auto mode stop	Faulty button, Signal fault			
05.1.97	**S075** - Switch, guard rail pump flow monitor	Flow monitor reports guard rail pump failure	During forward travel and at speeds greater than 16 km/h, u must be > 1.1 V	Circuit diagram Hydraulics	
05.1.98	**S025** - Switch, LS pump pressure monitor	LS pump pressure below 8 bar		Circuit diagram Sheet 7	
05.1.99	**S026** - Switch, steering pump flow controller	Flow monitor reports steering pump failure	At speeds >1000 rpm, u must be > 1.7 V		
05.1.9A	**S026** - Switch, steering pump flow controller	Plausibility check of steering pump flow monitor	When engine is OFF, u must be < 1.1 V	Circuit diagram Hydraulics	
05.1.9B	**S025** - Switch, LS pump pressure monitor	Faulty pressure switch		Circuit diagram Sheet 7	
05.1.9C	**S075** - Switch, guard rail pump flow monitor	Plausibility check on guard rail pump flow monitor	When stationary and during reverse travel, u must be < 1.1 V	Circuit diagram Hydraulics	

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
05.1.B0	**A050** - ECU, basic control unit	Initialisation error on communication driver, CAN bus communication restricted, checksum error, EEPROM GD routing data			EOL programming
05.1.B1	**S026** - Switch, steering pump flow controller	Plausibility check on steering pump flow monitor	When engine is OFF, u must be < 1.1 V	Circuit diagram Hydraulics	
05.1.B2	**S075** - Switch, guard rail pump flow monitor	Plausibility check on guard rail pump flow monitor	When stationary and during reverse travel, u must be < 1.1 V	Circuit diagram Hydraulics	
05.1.FE	**A050** - ECU, basic control unit	Checksum error, basic control unit	Applications will not start. They all display EXT bus fault		EOL programming
05.1.FF	**A050** - ECU, basic control unit	EEPROM fault in basic control unit			EOL programming

8 Fault code 06.1.00 -

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
06.1.01	**A039** - MFA, multifunction armrest Rear PTO button in cab ON/OFF	Faulty button, Signal fault	PTO disengages		
		Faulty bus			
06.1.02	**S020** - Button, rear PTO, external right	Faulty button, Signal fault	PTO can be engaged by pressing emergency button in cab for 5 seconds	Circuit diagram PTO	
06.1.03	**S019** - Button, rear PTO, external left	Faulty button, Signal fault	PTO can be engaged by pressing emergency button in cab for 5 seconds	Circuit diagram PTO	
06.1.04	**Y008** - Solenoid valve, rear PTO (clutch)	Actuation fault	PTO disengages	Circuit diagram PTO	
06.1.05	**B021** - Sensor, rear PTO speed (clutch)	Sensor faulty, Signal fault	PTO can be engaged by pressing emergency button in cab for 5 seconds	Circuit diagram PTO	
		12 V supply fault	A013, fuse 34		
06.1.10	**B020** - Sensor, rear PTO speed (stub shaft)	Sensor faulty, Signal fault	PTO can be engaged by pressing emergency button in cab for 5 seconds	Circuit diagram PTO	
		12 V supply fault	A013, fuse 35		
06.1.11	**A039** - MFA, multifunction armrest Automatic REAR PTO button	Faulty button, signal fault	PTO disengages, Auto mode OFF		
06.1.13	**B020** - Sensor, rear PTO speed (stub shaft)	Overspeed warning		Circuit diagram PTO	
06.1.15	**A039** - MFA, multifunction armrest Button neutral, REAR PTO	Faulty button, Signal fault	PTO speed cannot be modified or selected		
06.1.16	**A039** - MFA, multifunction armrest Button 540, REAR PTO	Faulty button, Signal fault	PTO speed cannot be modified or selected		
06.1.17	**A039** - MFA, multifunction armrest 540E button, REAR PTO	Faulty button, Signal fault	PTO speed cannot be modified or selected		
06.1.18	**A039** - MFA, multifunction armrest Button 1000, REAR PTO	Faulty button, Signal fault	PTO speed cannot be modified or selected		

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
06.1.19	**A039** - MFA, multifunction armrest 1000E button, REAR PTO	Faulty button, Signal fault	PTO speed cannot be modified or selected		
06.1.1A	**Y026** - Solenoid valve, rear PTO, stage I Speed rate 540	Actuation fault	PTO cannot be engaged	Circuit diagram PTO	
06.1.1B	**Y026** - Solenoid valve, rear PTO, stage I Speed rate 540E	Actuation fault	PTO cannot be engaged	Circuit diagram PTO	
06.1.1C	**Y027** - Solenoid valve, rear PTO, stage II Speed rate 1000	Actuation fault	PTO cannot be engaged	Circuit diagram PTO	
06.1.1D	**Y026** - Solenoid valve, rear PTO, stage I Speed rate 1000E	Actuation fault	PTO cannot be engaged	Circuit diagram PTO	
06.1.41	**A039** - MFA, multifunction armrest REAR PTO ON/OFF button (in cab)	has been pressed for more than 30 seconds, mechanical or electrical fault in button	Speed selector moves to "Neutral", no preselection possible		
06.1.42	**S020** - Button, rear PTO, external right	has been pressed for more than 30 seconds, mechanical or electrical fault in button	No preselection possible, PTO cannot be engaged.	Circuit diagram PTO	
06.1.43	**S019** - Button, rear PTO, external left	has been pressed for more than 30 seconds, mechanical or electrical fault in button	No preselection possible, PTO cannot be engaged.	Circuit diagram PTO	
06.1.45	**B021** - Sensor, rear PTO speed (clutch)	Speed selection in neutral, PTO clutch not engaged, B021 shows speed, PTO clutch disc pack does not separate, PTO brake not operational	Elec. speed selection remains possible, actuate PTO clutch ON/OFF button for at least 5 seconds (emergency mode)	Circuit diagram PTO	
		Speed is selected, PTO clutch 100% engaged, PTO clutch speed deviates by more than 20% from engine speed. PTO clutch disc pack slipping.	Elec. speed selection remains possible, actuate PTO clutch ON/OFF button for at least 5 seconds (emergency mode)		
		PTO clutch speed is below PTO stub speed	Elec. speed selection remains possible, actuate PTO clutch ON/OFF button for at least 5 seconds (emergency mode)		

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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-

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
06.1.50	**B020** - Sensor, rear PTO speed (stub shaft)	PTO stub shaft speed > 1300 rpm, signal fault in Hall sensor (B020 or B021)	Electr. speed selection possible, actuate PTO clutch ON/OFF button for at least 5 seconds (emergency mode)	Circuit diagram PTO	
		Selected speed is active, stub speed lower than clutch speed, power supply fault to B020 Hall sensor, speed selection solenoid valve (Y026, Y027) stuck in "OFF" position	Electr. speed selection possible, actuate PTO clutch ON/OFF button for at least 5 seconds (emergency mode). The corresponding speed cannot be selected if there is a solenoid valve fault.		
06.1.55	**A039** - MFA, multifunction armrest Button neutral, REAR PTO	has been pressed for more than 30 seconds, mechanical or electrical fault in button	No preselection possible		
06.1.56	**A039** - MFA, multifunction armrest Button 540, REAR PTO	has been pressed for more than 30 seconds, mechanical or electrical fault in button	No preselection possible		
06.1.57	**A039** - MFA, multifunction armrest 540E button, REAR PTO	has been pressed for more than 30 seconds, mechanical or electrical fault in button	No preselection possible		
06.1.58	**A039** - MFA, multifunction armrest Button 1000, REAR PTO	has been pressed for more than 30 seconds, mechanical or electrical fault in button	No preselection possible		
06.1.59	**A039** - MFA, multifunction armrest 1000E button, REAR PTO	has been pressed for more than 30 seconds, mechanical or electrical fault in button	No preselection possible		
06.1.60	**B020** - Sensor, rear PTO speed (stub shaft)	The actual speed of the PTO stub shaft (corrected by the transmission rate) differs by more than plus/minus 12% from setpoint speed of PTO clutch. Solenoid valve (Y026, Y027) incorrectly wired or seized. Mechanical fault in speed selector. Signal fault at Hall sensor (B020, B021)	Electr. speed selection possible, actuate PTO clutch ON/OFF button for at least 5 seconds (emergency mode). The corresponding speed cannot be selected if there is a solenoid valve fault.	Circuit diagram PTO	

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
06.1.81	**A039** - MFA, multifunction armrest REAR PTO ON/OFF button	Counter error			
06.1.95	**A039** - MFA, multifunction armrest Button neutral, REAR PTO	Counter error			EOL programming
06.1.96	**A039** - MFA, multifunction armrest Button 540, REAR PTO	Counter error			EOL programming
06.1.97	**A039** - MFA, multifunction armrest 540E button, REAR PTO	Counter error			EOL programming
06.1.98	**A039** - MFA, multifunction armrest Button 1000, REAR PTO	Counter error			EOL programming
06.1.99	**A039** - MFA, multifunction armrest 1000E button, REAR PTO	Counter error			EOL programming
06.1.A1	**A039** - MFA, multifunction armrest Button, REAR PTO	Communication fault			
06.1.B0	**A039** - MFA, multifunction armrest REAR PTO	Initialisation error on communication driver	CAN bus communication restricted		
06.1.B5	**A039** - MFA, multifunction armrest Button neutral, REAR PTO	Communication fault			
06.1.B6	**A039** - MFA, multifunction armrest Button 540, REAR PTO	Communication fault			
06.1.B7	**A039** - MFA, multifunction armrest 540E button, REAR PTO	Communication fault			
06.1.B8	**A039** - MFA, multifunction armrest Button 1000, REAR PTO	Communication fault			
06.1.B9	**A039** - MFA, multifunction armrest 1000E button, REAR PTO	Communication fault			
06.1.C0	**A050** - ECU, basic control unit	Warning: 540 stub shaft at rate 1000			
06.1.E0	**A050** - ECU, basic control unit	Checksum error, parameter current control for speed selector			EOL programming
06.1.E1	**A050** - ECU, basic control unit	Checksum error, PTO parameterisation	Use default values		EOL programming
06.1.E2	**A050** - ECU, basic control unit	Error in checksum PW rise of rear PTO	Use default values		EOL programming

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
06.1.E3	**A050** - ECU, basic control unit	Checksum error, for PW of PTO	Use default values		EOL programming
06.1.E4	**A050** - ECU, basic control unit	Checksum error, over/under step counter of PTO	Use default values		EOL programming
06.1.E5	**A050** - ECU, basic control unit	Checksum error, speed limit sensor after rear PTO clutch	Use default values		EOL programming
06.1.E6	**A050** - ECU, basic control unit	Checksum error, pulses per revolution for shuttle stub shaft	Use default values		EOL programming
06.1.E7	**A050** - ECU, basic control unit	Checksum error, temperature limits and switching times of rear PTO	Use default values		EOL programming
06.1.E8	**A050** - ECU, basic control unit	Checksum error, screens for showing/hiding diagnostics on front and rear PTOs	Use default values		EOL programming

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
07.1.01	**A039** - MFA, multifunction armrest Button, front PTO ON/OFF	Faulty button Signal fault			
		Faulty bus			
07.1.04	**Y011** - Front PTO solenoid valve (clutch)	Actuation fault		Circuit diagram trailer brake	
07.1.05	**B002** - Sensor, front PTO speed	Sensor faulty, Signal fault	PTO can be engaged by pressing emergency button in cab for 5 seconds	Circuit diagram PTO	
		12 V supply fault	A013, fuse 36		
07.1.09	**A039** - MFA, multifunction armrest Button, auto front PTO	Faulty button, Signal fault			
07.1.10	**B002** - Sensor, front PTO speed	Overspeed warning		Circuit diagram PTO	
07.1.41	**A039** - MFA, multifunction armrest Front PTO "ON" button	Plausibility error, button has been pressed for more than 30 seconds	Front PTO inoperable		
07.1.81	**A039** - MFA, multifunction armrest Cab button, FRONT PTO	Counter error			EOL programming
07.1.A1	**A039** - MFA, multifunction armrest Cab button, FRONT PTO	Communication fault			
07.1.B0	**A050** - ECU, basic control unit	Initialisation error on communication driver	CAN bus communication restricted		
07.1.C1	**B015** - Sensor, bevel pinion	Switch-on speed not reached for PTO/power lift auto mode		Circuit diagram Transmission control system	
07.1.E1	**A050** - ECU, basic control unit	Checksum error, front PTO parameterisation	Use default values		EOL programming

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
07.1.E2	**A050** - ECU, basic control unit	Error in checksum PW rise of front PTO	Use default values		EOL programming
07.1.E3	**A050** - ECU, basic control unit	Checksum error, PW of front PTO	Use default values		EOL programming
07.1.E4	**A050** - ECU, basic control unit	Checksum error, over/under step counter of front PTO	Use default values		EOL programming

10 Fault code 08.1.00 -

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
08.1.00	**Y077 [HKH]** - Cut-off valve, rear EPC	Unknown rear EPC fault			
08.1.22	**B030** - Sensor, rear power lift position	Sensor faulty, Signal fault	No control possible, operable via external button only	Circuit diagram Hydraulics	
		8.5 V supply	A013, fuse 15		
08.1.23	**A039** - MFA, multifunction armrest Setpoint value potentiometer, rear power lift	Faulty setpoint value potentiometer Signal fault	Setpoint values cannot be set Only position control possible		
08.1.24	External sensor, rear power lift Steering axle automatic mode	Faulty external sensor, Signal fault	No control possible, operable via external button only		
08.1.31	**B031** - Sensor, draft sensing pin, right	Faulty draught sensing pin Signal fault	Only position control possible	Circuit diagram Hydraulics	
		8.5 V supply	A013, fuse 14		
08.1.32	**B032** - Sensor, draft sensing pin, left	Faulty draught sensing pin Signal fault	Only position control possible	Circuit diagram Hydraulics	
		8.5 V supply	A013, fuse 13		
08.1.33	**B031** - Sensor, draft sensing pin, right	Warning, draught sensing pin, right overloaded	Warning message only		
08.1.34	**B032** - Sensor, draft sensing pin, left	Warning, draught sensing pin, left overloaded	Warning message only		
08.1.40	**S029** - Button, rear power lift, left-hand external raise	Faulty button, Signal fault	Button inoperable until next trouble-free cold start	Circuit diagram Hydraulics	
08.1.41	**S030** - Button, rear power lift, left-hand external lower	Faulty button, Signal fault	Button inoperable until next trouble-free cold start	Circuit diagram Hydraulics	
08.1.42	**S027** - Button, rear power lift, right-hand external raise	Faulty button, Signal fault	Button inoperable until next trouble-free cold start	Circuit diagram Hydraulics	

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
08.1.43	**S028** - Button, rear power lift, right-hand external lower	Faulty button, Signal fault	Button inoperable until next trouble-free cold start	Circuit diagram Hydraulics	
08.1.44	**A039** - MFA, multifunction armrest Button, stop rear power lift	Faulty button, Signal fault	Button inoperable until next trouble-free cold start		
08.1.45	**A039** - MFA, multifunction armrest Transport button, quick lift, rear power lift	Faulty button, Signal fault	Button inoperable until next trouble-free cold start		
08.1.46	**A039** - MFA, multifunction armrest Control button, quick lift, rear power lift	Faulty button, Signal fault	Button inoperable until next trouble-free cold start		
08.1.47	**A039** - MFA, multifunction armrest Forced lowering button, quick lift, rear power lift	Faulty button, Signal fault	Button inoperable until next trouble-free cold start		
08.1.48	**A039** - MFA, multifunction armrest Button, rear power lift	Communication fault	Button inoperable until next trouble-free cold start		
08.1.49	**Y055** - Rear pressure compensator lock valve	Faulty valve	Valve moves to neutral and locks	Circuit diagram Hydraulics	
08.1.4A	**Y062** - Solenoid valve, field pressure control (rear)	Faulty valve	Valve moves to neutral and locks	Circuit diagram Hydraulics	
08.1.4B	**A039** - MFA, multifunction armrest Button, auto rear power lift	Faulty button (output via TeachIn)	No auto mode		
08.1.A2	**Y077 [HKH]** - Cut-off valve, rear EPC	EEPROM is faulty (Valve)	Valve moves to neutral and locks		EOL programming
08.1.A3	**Y077 [HKH]** - Cut-off valve, rear EPC	RAM_Test	Valve moves to neutral and locks Pilot pressure OFF		
08.1.A4	**Y077 [HKH]** - Cut-off valve, rear EPC	Flash_Test	Valve moves to neutral and locks Pilot pressure OFF		
08.1.A5	**Y077 [HKH]** - Cut-off valve, rear EPC	Incorrect valve code (SA/DA) for selecting EOL	Valve moves to neutral and locks		EOL programming

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
08.1.B0	**B030** - Sensor, rear power lift position	Position sensor not calibrated	No control possible, operable only via external button	Calibration code "8002"	
08.1.B2	**A039** - MFA, multifunction armrest Setpoint value potentiometer, rear power lift	Setpoint value potentiometer not calibrated	Setpoint values cannot be set, only position control possible	Calibration code "8001"	
08.1.B3	**X015** - External control socket	External sensor not calibrated	Default values are used		
08.1.C0	**A039** - MFA, multifunction armrest	MFA not fitted	No auto mode possible, operable only via external button		
08.1.C1	**A073** - Terminal (A4)	Terminal not fitted	Configuration cannot be changed		
08.1.F0	**Y077 [HKH]** - Cut-off valve, rear EPC	Valve does not report to V bus	No actuation possible		
08.1.F2	**Y077 [HKH]** - Cut-off valve, rear EPC	Undervoltage (where U < 8V)	Valve moves to neutral and locks		
08.1.F3	**Y077 [HKH]** - Cut-off valve, rear EPC	Overvoltage, safe (where U > 18 V)	Valve moves to neutral and locks		
08.1.F4	**Y077 [HKH]** - Cut-off valve, rear EPC	Valve actuator falls short (frequent cause: brief control pressure dips or oil too viscous at very low temperatures)	Valve moves to neutral and locks		
08.1.F5	**Y077 [HKH]** - Cut-off valve, rear EPC	High overvoltage (> 45V)	Valve moves to neutral and locks		
08.1.F6	**Y077 [HKH]** - Cut-off valve, rear EPC	Output stage error	Valve moves to neutral and locks		
08.1.F7	**Y077 [HKH]** - Cut-off valve, rear EPC	Position pickup sensor error	Valve moves to neutral and locks Pilot pressure OFF		
08.1.F8	**Y077 [HKH]** - Cut-off valve, rear EPC	Valve actuator does not return to neutral position; frequent cause: valve actuator mechanically jams (pilot control or main actuator) due to contamination in hydraulics area	Valve remains deflected when engine is on, valve locks, pilot pressure OFF		

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

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
08.1.F9	**Y077 [HKH]** - Cut-off valve, rear EPC	Valve actuator not in neutral position when switched on; frequent cause: valve actuator mechanically jams (pilot control or main actuator) due to contamination in hydraulics area	Valve remains deflected when engine is on, valve locks, pilot pressure OFF		
08.1.FA	**Y077 [HKH]** - Cut-off valve, rear EPC	Valve actuator deflected too far	Valve moves to neutral and locks		
08.1.FB	**Y077 [HKH]** - Cut-off valve, rear EPC	Floating position is not reached	Valve moves to neutral and locks		
08.1.FC	**Y077 [HKH]** - Cut-off valve, rear EPC	Manual actuation (occurs when a valve is deflected from its neutral position)	Valve locked, pilot pressure OFF		
08.1.FD	**Y077 [HKH]** - Cut-off valve, rear EPC	Pilot control actuator jams	Valve locked, pilot pressure OFF		
08.1.FF	**Y077 [HKH]** - Cut-off valve, rear EPC	No setpoint message, no configuration message, setpoint message not plausible, configuration message not plausible. Potentiometer/PWM error	Valve moves to neutral and locks		

11 Fault code 09.1.00 -

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
09.1.00	**Y070 [FKH]** - Cut-off valve, front power lift enhanced control	Unknown error, front EPC			
09.1.22	**B040** - Sensor, front power lift position	Sensor faulty, Faulty signal line	No control possible, operable only via external button	Circuit diagram Hydraulics	
		8.5 V supply	A013, fuse 12		
09.1.23	**A039** - MFA, multifunction armrest Setpoint potentiometer, front power lift	Faulty setpoint value potentiometer Signal fault	Setpoint values cannot be set, only position control possible		
09.1.40	**S021** - Button, front power lift, external raise	Faulty button, Signal fault	Button inoperable until next trouble-free cold start	Circuit diagram Hydraulics	
09.1.41	**S022** - Button, front power lift, external lower	Faulty button, Signal fault	Button inoperable until next trouble-free cold start	Circuit diagram Hydraulics	
09.1.44	**A039** - MFA, multifunction armrest Stop button, front power lift	Faulty button, Signal fault	Button inoperable until next trouble-free cold start		
09.1.45	**A039** - MFA, multifunction armrest Transport button, quick lift, front power lift	Faulty button, Signal fault	Button inoperable until next trouble-free cold start		
09.1.46	**A039** - MFA, multifunction armrest Control button, quick lift, front power lift	Faulty button, Signal fault	Button inoperable until next trouble-free cold start		
09.1.47	**A039** - MFA, multifunction armrest Forced lowering button, quick lift, front power lift	Faulty button, Signal fault	Button inoperable until next trouble-free cold start		
09.1.48	**A039** - MFA, multifunction armrest Button, front power lift	Button, communication fault	Button inoperable until next trouble-free cold start		
09.1.49	**Y021** - Front pressure compensator lock valve	Faulty lock valve, pressure compensator	Valve moves to neutral and locks	Circuit diagram Hydraulics	
09.1.4A	**Y022** - Field pressure control solenoid valve (front),	Faulty pressure-limiting valve	Valve moves to neutral and locks	Circuit diagram Hydraulics	

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
09.1.4B	**A039** - MFA, multifunction armrest Button, auto front power lift	Auto front power lift button faulty (output via TeachIn)			
09.1.A2	**Y070 [FKH]** - Cut-off valve, front power lift enhanced control	EEPROM error (valve)	Valve moves to neutral and locks		
09.1.A3	**Y070 [FKH]** - Cut-off valve, front power lift enhanced control	RAM_Test	Valve moves to neutral and locks Pilot pressure OFF		EOL programming
09.1.A4	**Y070 [FKH]** - Cut-off valve, front power lift enhanced control	Flash_Test	Valve moves to neutral and locks Pilot pressure OFF		EOL programming
09.1.A5	**Y070 [FKH]** - Cut-off valve, front power lift enhanced control	Incorrect valve code (SA/DA) for selecting EOL			EOL programming
09.1.B0	**B040** - Sensor, front power lift position	Position sensor not calibrated	No control possible, operable only via external button	Calibration code "9002"	
09.1.B2	**A039** - MFA, multifunction armrest Setpoint potentiometer, front power lift	Setpoint value potentiometer not calibrated	Setpoint values cannot be set, only position control possible	Calibration code "9001"	
09.1.C0	**A039** - MFA, multifunction armrest	MFA not fitted	No auto mode possible, operable only via external button		
09.1.C1	**A039** - MFA, multifunction armrest Terminal	Terminal not fitted	Configuration cannot be changed		
09.1.CE	**A007** - Instrument panel	Temperature limit warning	Is not stored		
09.1.CF	**A007** - Instrument panel	Temperature limit warning	Is not stored		
09.1.E0	**Y070 [FKH]** - Cut-off valve, front power lift enhanced control	Valve does not report to V bus	Valve moves to neutral and locks		
09.1.E2	**Y070 [FKH]** - Cut-off valve, front power lift enhanced control	Undervoltage (where U < 8V)	Valve moves to neutral and locks		
09.1.E3	**Y070 [FKH]** - Cut-off valve, front power lift enhanced control	Overvoltage, safe (where U > 18 V)	Valve moves to neutral and locks		
09.1.E4	**Y070 [FKH]** - Cut-off valve, front power lift enhanced control	Valve actuator falls short (frequent cause: brief control pressure dips or oil too viscous at very low temperatures)	Valve moves to neutral and locks		

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
09.1.E5	**Y070 [FKH]** - Cut-off valve, front power lift enhanced control	High overvoltage (> 45V)	Valve moves to neutral and locks		
09.1.E6	**Y070 [FKH]** - Cut-off valve, front power lift enhanced control	Final stage error (pilot control solenoid valve)	Valve moves to neutral and locks		
09.1.E7	**Y070 [FKH]** - Cut-off valve, front power lift enhanced control	Position pickup sensor error	Valve moves to neutral and locks Pilot pressure OFF		
09.1.E8	**Y070 [FKH]** - Cut-off valve, front power lift enhanced control	Valve actuator does not return to neutral position; frequent cause: valve actuator mechanically jams (pilot control or main actuator) due to contamination in hydraulics area	Valve remains deflected when engine is on, valve locks, pilot pressure OFF		
09.1.E9	**Y070 [FKH]** - Cut-off valve, front power lift enhanced control	Valve actuator not in neutral position when switched on (frequent cause: valve actuator mechanically jams (pilot control or main actuator) caused by contamination in hydraulics area)	Valve remains deflected when engine is on, valve locks, pilot pressure OFF		
09.1.EA	**Y070 [FKH]** - Cut-off valve, front power lift enhanced control	Valve actuator deflected too far	Valve moves to neutral and locks		
09.1.EB	**Y070 [FKH]** - Cut-off valve, front power lift enhanced control	Floating position is not reached	Valve moves to neutral and locks		
09.1.EC	**Y070 [FKH]** - Cut-off valve, front power lift enhanced control	Manual actuation (occurs when a valve is deflected from its neutral position)	Valve locked, pilot pressure OFF		
09.1.ED	**Y070 [FKH]** - Cut-off valve, front power lift enhanced control	Pilot control actuator jams	Valve locked, pilot pressure OFF		
09.1.EF	**Y070 [FKH]** - Cut-off valve, front power lift enhanced control	No setpoint message, no configuration message, setpoint message not plausible, configuration message not plausible	Valve moves to neutral and locks Pilot pressure OFF		

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-

12 Fault code 0A.1.00 -

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
X stands for the valve number, e.g. 0A.1.10 = position 1 valve does not report to CAN or 0A.1.37 = position pickup sensor error in position 3 valve					
0A.1.X0	**Y071 [2.1]** - Auxiliary control valve (olive) Position 7 **Y072 [2.2]** - Auxiliary control valve (grey) Position 8 **Y074 [1.1]** - Auxiliary control valve (yellow) Position 1 **Y075 [1.2]** - Auxiliary control valve (blue) Position 2 **Y076 [1.3]** - Auxiliary control valve (red) Position 3 **Y078 [1.4]** - Auxiliary control valve (green) Position 4 **Y079 [1.5]** - Auxiliary control valve (brown) Position 5 **Y080 [1.6]** - Auxiliary control valve (violet) Position 6	Valve does not report to CAN bus **(X= valve number)**	Valve moves to neutral and locks	Circuit diagram Hydraulics/Auto-Guide	
0A.1.X1	**Y071 [2.1]** - Auxiliary control valve (olive) Position 7 **Y072 [2.2]** - Auxiliary control valve (grey) Position 8 **Y074 [1.1]** - Auxiliary control valve (yellow) Position 1 **Y075 [1.2]** - Auxiliary control valve (blue) Position 2 **Y076 [1.3]** - Auxiliary control valve (red) Position 3 **Y078 [1.4]** - Auxiliary control valve (green) Position 4 **Y079 [1.5]** - Auxiliary control valve (brown) Position 5 **Y080 [1.6]** - Auxiliary control valve (violet) Position 6	EEPROM inconsistent	Valve moves to neutral and locks	Circuit diagram Hydraulics/Auto-Guide	

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
0A.1.X2	**Y071 [2.1]** - Auxiliary control valve (olive) Position 7 **Y072 [2.2]** - Auxiliary control valve (grey) Position 8 **Y074 [1.1]** - Auxiliary control valve (yellow) Position 1 **Y075 [1.2]** - Auxiliary control valve (blue) Position 2 **Y076 [1.3]** - Auxiliary control valve (red) Position 3 **Y078 [1.4]** - Auxiliary control valve (green) Position 4 **Y079 [1.5]** - Auxiliary control valve (brown) Position 5 **Y080 [1.6]** - Auxiliary control valve (violet) Position 6	Undervoltage (where U < 8V)	Valve moves to neutral and locks	Circuit diagram Hydraulics/Auto-Guide	
0A.1.X3	**Y071 [2.1]** - Auxiliary control valve (olive) Position 7 **Y072 [2.2]** - Auxiliary control valve (grey) Position 8 **Y074 [1.1]** - Auxiliary control valve (yellow) Position 1 **Y075 [1.2]** - Auxiliary control valve (blue) Position 2 **Y076 [1.3]** - Auxiliary control valve (red) Position 3 **Y078 [1.4]** - Auxiliary control valve (green) Position 4 **Y079 [1.5]** - Auxiliary control valve (brown) Position 5 **Y080 [1.6]** - Auxiliary control valve (violet) Position 6	Overvoltage, safe (where U > 18 V)	Valve moves to neutral and locks	Circuit diagram Hydraulics/Auto-Guide	

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
0A.1.X4	**Y071 [2.1]** - Auxiliary control valve (olive) Position 7 **Y072 [2.2]** - Auxiliary control valve (grey) Position 8 **Y074 [1.1]** - Auxiliary control valve (yellow) Position 1 **Y075 [1.2]** - Auxiliary control valve (blue) Position 2 **Y076 [1.3]** - Auxiliary control valve (red) Position 3 **Y078 [1.4]** - Auxiliary control valve (green) Position 4 **Y079 [1.5]** - Auxiliary control valve (brown) Position 5 **Y080 [1.6]** - Auxiliary control valve (violet) Position 6	Valve actuator falls short (frequent cause: brief control pressure dips or oil too viscous at very low temperatures)	Valve moves to neutral and locks	Circuit diagram Hydraulics/Auto-Guide	
0A.1.X5	**Y071 [2.1]** - Auxiliary control valve (olive) Position 7 **Y072 [2.2]** - Auxiliary control valve (grey) Position 8 **Y074 [1.1]** - Auxiliary control valve (yellow) Position 1 **Y075 [1.2]** - Auxiliary control valve (blue) Position 2 **Y076 [1.3]** - Auxiliary control valve (red) Position 3 **Y078 [1.4]** - Auxiliary control valve (green) Position 4 **Y079 [1.5]** - Auxiliary control valve (brown) Position 5 **Y080 [1.6]** - Auxiliary control valve (violet) Position 6	High overvoltage (> 45V)	Valve moves to neutral and locks	Circuit diagram Hydraulics/Auto-Guide	

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
0A.1.X6	**Y071 [2.1]** - Auxiliary control valve (olive) Position 7 **Y072 [2.2]** - Auxiliary control valve (grey) Position 8 **Y074 [1.1]** - Auxiliary control valve (yellow) Position 1 **Y075 [1.2]** - Auxiliary control valve (blue) Position 2 **Y076 [1.3]** - Auxiliary control valve (red) Position 3 **Y078 [1.4]** - Auxiliary control valve (green) Position 4 **Y079 [1.5]** - Auxiliary control valve (brown) Position 5 **Y080 [1.6]** - Auxiliary control valve (violet) Position 6	Final stage error (pilot control solenoid valve)	Valve moves to neutral and locks	Circuit diagram Hydraulics/Auto-Guide	
0A.1.X7	**Y071 [2.1]** - Auxiliary control valve (olive) Position 7 **Y072 [2.2]** - Auxiliary control valve (grey) Position 8 **Y074 [1.1]** - Auxiliary control valve (yellow) Position 1 **Y075 [1.2]** - Auxiliary control valve (blue) Position 2 **Y076 [1.3]** - Auxiliary control valve (red) Position 3 **Y078 [1.4]** - Auxiliary control valve (green) Position 4 **Y079 [1.5]** - Auxiliary control valve (brown) Position 5 **Y080 [1.6]** - Auxiliary control valve (violet) Position 6	Position pickup sensor error	Valve moves to neutral and locks	Circuit diagram Hydraulics/Auto-Guide	

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
0A.1.X8	**Y071 [2.1]** - Auxiliary control valve (olive) Position 7 **Y072 [2.2]** - Auxiliary control valve (grey) Position 8 **Y074 [1.1]** - Auxiliary control valve (yellow) Position 1 **Y075 [1.2]** - Auxiliary control valve (blue) Position 2 **Y076 [1.3]** - Auxiliary control valve (red) Position 3 **Y078 [1.4]** - Auxiliary control valve (green) Position 4 **Y079 [1.5]** - Auxiliary control valve (brown) Position 5 **Y080 [1.6]** - Auxiliary control valve (violet) Position 6	Valve actuator does not return to neutral position (frequent cause: valve actuator mechanically jams (pilot control or main actuator) caused by contamination in hydraulics area)	Valve remains deflected when engine is on; valve locks, Pilot pressure OFF	Circuit diagram Hydraulics/Auto-Guide	
0A.1.X9	**Y071 [2.1]** - Auxiliary control valve (olive) Position 7 **Y072 [2.2]** - Auxiliary control valve (grey) Position 8 **Y074 [1.1]** - Auxiliary control valve (yellow) Position 1 **Y075 [1.2]** - Auxiliary control valve (blue) Position 2 **Y076 [1.3]** - Auxiliary control valve (red) Position 3 **Y078 [1.4]** - Auxiliary control valve (green) Position 4 **Y079 [1.5]** - Auxiliary control valve (brown) Position 5 **Y080 [1.6]** - Auxiliary control valve (violet) Position 6	Valve actuator not in neutral position when switched on (frequent cause: valve actuator mechanically jams (pilot control or main actuator) caused by contamination in hydraulics area)	Valve remains deflected when engine is on; valve locks, Pilot pressure OFF	Circuit diagram Hydraulics/Auto-Guide	

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
0A.1.XA	**Y071 [2.1]** - Auxiliary control valve (olive) Position 7 **Y072 [2.2]** - Auxiliary control valve (grey) Position 8 **Y074 [1.1]** - Auxiliary control valve (yellow) Position 1 **Y075 [1.2]** - Auxiliary control valve (blue) Position 2 **Y076 [1.3]** - Auxiliary control valve (red) Position 3 **Y078 [1.4]** - Auxiliary control valve (green) Position 4 **Y079 [1.5]** - Auxiliary control valve (brown) Position 5 **Y080 [1.6]** - Auxiliary control valve (violet) Position 6	Valve actuator deflected too far	Valve moves to neutral and locks	Circuit diagram Hydraulics/Auto-Guide	
0A.1.XB	**Y071 [2.1]** - Auxiliary control valve (olive) Position 7 **Y072 [2.2]** - Auxiliary control valve (grey) Position 8 **Y074 [1.1]** - Auxiliary control valve (yellow) Position 1 **Y075 [1.2]** - Auxiliary control valve (blue) Position 2 **Y076 [1.3]** - Auxiliary control valve (red) Position 3 **Y078 [1.4]** - Auxiliary control valve (green) Position 4 **Y079 [1.5]** - Auxiliary control valve (brown) Position 5 **Y080 [1.6]** - Auxiliary control valve (violet) Position 6	Floating position is not reached	Valve moves to neutral and locks	Circuit diagram Hydraulics/Auto-Guide	

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
0A.1.XC	**Y071 [2.1]** - Auxiliary control valve (olive) Position 7 **Y072 [2.2]** - Auxiliary control valve (grey) Position 8 **Y074 [1.1]** - Auxiliary control valve (yellow) Position 1 **Y075 [1.2]** - Auxiliary control valve (blue) Position 2 **Y076 [1.3]** - Auxiliary control valve (red) Position 3 **Y078 [1.4]** - Auxiliary control valve (green) Position 4 **Y079 [1.5]** - Auxiliary control valve (brown) Position 5 **Y080 [1.6]** - Auxiliary control valve (violet) Position 6	Manual actuation (occurs when a valve is deflected from its neutral position)	All valve positions, no function; Valve locked, Pilot pressure OFF	Circuit diagram Hydraulics/Auto-Guide	
0A.1.XD	**Y071 [2.1]** - Auxiliary control valve (olive) Position 7 **Y072 [2.2]** - Auxiliary control valve (grey) Position 8 **Y074 [1.1]** - Auxiliary control valve (yellow) Position 1 **Y075 [1.2]** - Auxiliary control valve (blue) Position 2 **Y076 [1.3]** - Auxiliary control valve (red) Position 3 **Y078 [1.4]** - Auxiliary control valve (green) Position 4 **Y079 [1.5]** - Auxiliary control valve (brown) Position 5 **Y080 [1.6]** - Auxiliary control valve (violet) Position 6	Pilot control actuator jams	Valve locked, Pilot pressure OFF	Circuit diagram Hydraulics/Auto-Guide	

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
0A.1.XE	**Y071 [2.1]** - Auxiliary control valve (olive) Position 7 **Y072 [2.2]** - Auxiliary control valve (grey) Position 8 **Y074 [1.1]** - Auxiliary control valve (yellow) Position 1 **Y075 [1.2]** - Auxiliary control valve (blue) Position 2 **Y076 [1.3]** - Auxiliary control valve (red) Position 3 **Y078 [1.4]** - Auxiliary control valve (green) Position 4 **Y079 [1.5]** - Auxiliary control valve (brown) Position 5 **Y080 [1.6]** - Auxiliary control valve (violet) Position 6	RAM or FLASH test fault	Valve moves to neutral and locks, pilot pressure OFF	Circuit diagram Hydraulics/Auto-Guide	
0A.1.XF	**Y071 [2.1]** - Auxiliary control valve (olive) Position 7 **Y072 [2.2]** - Auxiliary control valve (grey) Position 8 **Y074 [1.1]** - Auxiliary control valve (yellow) Position 1 **Y075 [1.2]** - Auxiliary control valve (blue) Position 2 **Y076 [1.3]** - Auxiliary control valve (red) Position 3 **Y078 [1.4]** - Auxiliary control valve (green) Position 4 **Y079 [1.5]** - Auxiliary control valve (brown) Position 5 **Y080 [1.6]** - Auxiliary control valve (violet) Position 6	No setpoint message, no configuration message, setpoint message not plausible, configuration message not plausible. Potentiometer/PW error	Valve moves to neutral and locks Pilot pressure OFF	Circuit diagram Hydraulics/Auto-Guide	

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
0A.1.A2	**Y071 [2.1]** - Auxiliary control valve (olive) Position 7 **Y072 [2.2]** - Auxiliary control valve (grey) Position 8 **Y074 [1.1]** - Auxiliary control valve (yellow) Position 1 **Y075 [1.2]** - Auxiliary control valve (blue) Position 2 **Y076 [1.3]** - Auxiliary control valve (red) Position 3 **Y078 [1.4]** - Auxiliary control valve (green) Position 4 **Y079 [1.5]** - Auxiliary control valve (brown) Position 5 **Y080 [1.6]** - Auxiliary control valve (violet) Position 6	More valves connected than registered via EOL programming			
0A.1.B0	**A039** - MFA, multifunction armrest Crossgate lever	Crossgate lever is not calibrated	Crossgate lever not working	Calibration code "1001"	
0A.1.B1	**A039** - MFA, multifunction armrest Crossgate lever	Crossgate lever X axis faulty or engaged when ignition switched on	Crossgate lever not working		
0A.1.B2	**A039** - MFA, multifunction armrest Crossgate lever	Crossgate lever Y axis faulty or engaged when ignition switched on	Crossgate lever not working		
0A.1.B3	**A039** - MFA, multifunction armrest Crossgate lever	Crossgate lever missing (both axles)	Crossgate lever not working		
0A.1.B5	**A039** - MFA, multifunction armrest	Joystick centre position recognition faulty (electrical fault) or engaged when ignition switched on	Valve position not functioning, lock valve		
0A.1.B6	**A039** - MFA, multifunction armrest	Linear module 1 (rocker) not calibrated	Valve position not functioning	Calibration code "1003"	
0A.1.B7	**A039** - MFA, multifunction armrest	Linear module 1 (rocker) faulty or engaged when ignition switched on	Valve position not functioning, lock valve		
0A.1.B8	**A039** - MFA, multifunction armrest	Linear module 2 (rocker) not calibrated	Valve position not functioning	Calibration code "1004"	

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
0A.1.B9	**A039** - MFA, multifunction armrest	Linear module 2 (rocker) faulty or engaged when ignition switched on	Valve position not functioning, lock valve		
0A.1.BA	**A039** - MFA, multifunction armrest	Linear module 3 (rocker) not calibrated	Valve position not functioning	Calibration code "1005"	
0A.1.BB	**A039** - MFA, multifunction armrest	Linear module 3 (rocker) faulty or engaged when ignition switched on	Valve position not functioning, lock valve		
0A.1.BC	**A039** - MFA, multifunction armrest	Linear module 4 (rocker) not calibrated	Valve position not functioning	Calibration code "1006"	
0A.1.BD	**A039** - MFA, multifunction armrest	Faulty linear module 4 (rocker)	Valve position not functioning, lock valve		
0A.1.C0	**A039** - MFA, multifunction armrest	MFA not fitted	No auto mode, Valve locked		
0A.1.C1	**A039** - MFA, multifunction armrest **A050** - ECU, basic control unit	MFA GD fault in button used by hydraulics	Valve locked		
0A.1.C2	**A039** - MFA, multifunction armrest	Faulty MFA button (general locking)	Total lock not possible, valves locking		
0A.1.C5	**A039** - MFA, multifunction armrest	Faulty MFA button (switching function)	No switching function possible, switching function maintained prior to error		
0A.1.CA	**A050** - ECU, basic control unit	Steering axle checksum incorrect	Steering axle deactivation		EOL programming
0A.1.CB	**A050** - ECU, basic control unit	Steering axle active	Warning message only		
0A.1.CC	**A050** - ECU, basic control unit	Steering axle not active	Warning message only		
0A.1.CE	Auxiliary control units	Valve actuator does not return to neutral position	Valve remains deflected when engine is on, valve locks, pilot pressure OFF		
0A.1.CF	Auxiliary control units	Floating position is not reached	Valve moves to neutral and locks		
0A.1.D0	**A039** - MFA, multifunction armrest Button, hydraulic circuit 3	Faulty button, Signal fault	Button inoperable until next trouble-free cold start		

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
0A.1.D1	**A039** - MFA, multifunction armrest Button, hydraulic circuit 4	Faulty button, Signal fault	Button inoperable until next trouble-free cold start		
0A.1.D2	**A039** - MFA, multifunction armrest Red raise/lower/floating position button on joystick	Faulty button, Signal fault	Valve position not functioning, Valve locked		
0A.1.D3	**A039** - MFA, multifunction armrest Green raise/lower/floating position button on joystick	Faulty button, Signal fault	Valve position not functioning, Valve locked		
0A.1.D4	**S021** - Button, front power lift, external raise **S022** - Button, front power lift, external lower	Double actuation; Faulty button, Signal fault	Valve in neutral	Circuit diagram Hydraulics	
0A.1.D5	**S022** - Button, front power lift, external lower	Faulty button, Signal fault	Button inoperable until next trouble-free cold start	Circuit diagram Hydraulics	
0A.1.D6	**S021** - Button, front power lift, external raise	Faulty button, Signal fault	Button inoperable until next trouble-free cold start	Circuit diagram Hydraulics	
0A.1.D7	**B084** - Sensor, hydraulic oil level	Sensor faulty, Signal fault	Fill level is no longer monitored	Circuit diagram Instrument panel/ABS/operator's seat	
0A.1.D8	**B084** - Sensor, hydraulic oil level	Warning, hydraulic oil tank	Warning display only		
0A.1.D9	**B084** - Sensor, hydraulic oil level	Hydraulic oil tank empty	Valves are locked and pilot control is switched off	Circuit diagram Instrument panel/ABS/operator's seat	
0A.1.DA	**B013** - Sensor, hydraulic oil temperature	Warning, hydraulic oil temperature too high	Warning display only (without storing)		
0A.1.DB	**B013** - Sensor, hydraulic oil temperature	Hydraulic oil temperature too high	Is stored	Circuit diagram Instrument panel/ABS/operator's seat	
0A.1.DC	**B013** - Sensor, hydraulic oil temperature	Warning, hydraulic oil temperature not plausible	Warning display only		

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
0A.1.DD	**B063** - Pressure switch, filter contamination (hydraulic circuit)	Filter clogged	Warning display only		
0A.1.DE	**B063** - Pressure switch, filter contamination (hydraulic circuit)	Faulty switch, Signal fault	Warning display only		
0A.1.DF	**Y071 [2.1]** - Auxiliary control valve (olive) Position 7 **Y072 [2.2]** - Auxiliary control valve (grey) Position 8 **Y074 [1.1]** - Auxiliary control valve (yellow) Position 1 **Y075 [1.2]** - Auxiliary control valve (blue) Position 2 **Y076 [1.3]** - Auxiliary control valve (red) Position 3 **Y078 [1.4]** - Auxiliary control valve (green) Position 4 **Y079 [1.5]** - Auxiliary control valve (brown) Position 5 **Y080 [1.6]** - Auxiliary control valve (violet) Position 6	Prio volume greater than pump volume			
0A.1.EC	**Y088** - Solenoid valve, release trailer brake	ABV: bypass output 2 faulty (handbrake)			
0A.1.F0	**Y032** - Control pressure solenoid valve	+UB short circuit	No valve actuation possible	Circuit diagram Hydraulics	
0A.1.F2	**Y032** - Control pressure solenoid valve	Current too high, faulty valve (short circuit to earth)	No valve actuation possible	Circuit diagram Hydraulics	
0A.1.F3	**Y032** - Control pressure solenoid valve	Break in wiring	No valve actuation possible	Circuit diagram Hydraulics	
0A.1.F4	**Y021** - Lifting solenoid valve (standard front power lift)	Short circuit to earth or +UB or break in wiring	No raising possible	Circuit diagram Hydraulics	
0A.1.F5	**Y022** - Lowering solenoid valve (standard front power lift)	Short circuit to earth or +UB or break in wiring	No lowering possible	Circuit diagram Hydraulics	
0A.1.F6	**Y060** - Hydraulic oil pre-heater solenoid valve (rear)	Actuation fault	No further valve heating possible	Circuit diagram Hydraulics	
0A.1.F7	**Y061** - hydraulic oil pre-heater solenoid valve (middle)	Actuation fault	No further valve heating possible	Circuit diagram Hydraulics	

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
0A.1.F8	**Y084** - Solenoid valve, Power BeyondIn Power Beyond mode	Actuation fault	No control pressure increase possible	Circuit diagram Hydraulics	
0A.1.FA	**S067** - Button, valve actuation, external raise	Faulty button, Signal fault	Button inoperable until next trouble-free cold start	Circuit diagram Hydraulics	
0A.1.FB	**S068** - Button, valve actuation, external lower	Faulty button, Signal fault	Button inoperable until next trouble-free cold start	Circuit diagram Hydraulics	
0A.1.FC	**S067** - Button, valve actuation, external raise **S068** - Button, valve actuation, external lower	Double actuation, faulty button, signal fault		Circuit diagram Hydraulics	
0A.1.FD	**Y082** - Solenoid valve, lower link stabiliser, lock	Solenoid valve faulty	No locking possible	Circuit diagram Suspension/Auto-Guide	
0A.1.FE	**Y083** - Solenoid valve, lower link stabiliser, release	Solenoid valve faulty	No opening possible	Circuit diagram Suspension/Auto-Guide	

13 Fault code 0B.1.00 -

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
0B.1.11	**A050** - ECU, basic control unit TeachIn	Electrical fault, internal communication			
0B.1.12	**A050** - ECU, basic control unit TeachIn	Electrical fault, terminal			
0B.1.21	**A050** - ECU, basic control unit TeachIn	Internal communication error			
0B.1.22	**A050** - ECU, basic control unit **A073** - Terminal (A4) TeachIn	Communication error between Terminal and TeachIn			
0B.1.23	**A050** - ECU, basic control unit **A039** - MFA, multifunction armrest TeachIn	Communication error between MFA and TeachIn			
0B.1.25	**A050** - ECU, basic control unit **A039** - MFA, multifunction armrest TeachIn	MFA does not report to bus			
0B.1.41	**A050** - ECU, basic control unit TeachIn	Internal communication saving or read-out error			EOL programming
0B.1.42	**A050** - ECU, basic control unit **A073** - Terminal (A4) TeachIn	Memory or read-out error between Teminal and TeachIn			EOL programming
0B.1.43	**A050** - ECU, basic control unit **A039** - MFA, multifunction armrest TeachIn	Memory or read-out error between MFA and TeachIn			EOL programming
0B.1.B0	**A050** - ECU, basic control unit TeachIn	CAN communication Teach-In initialisation error			EOL programming
0B.1.B1	**A050** - ECU, basic control unit TeachIn	Saving or read-out error in sequence data			Delete sequence and reprogram
0B.1.B2	**A050** - ECU, basic control unit TeachIn	EEPROM checksum error, initialising sequence data storage			

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
0B.1.B3	**A050** - ECU, basic control unit	"No memory available for sequence data or configuration/sequence data do not match"			
0B.1.B4	**A050** - ECU, basic control unit TeachIn	Configuration wizard: error with writing or reading settings and parameters on tractor start-up/end or formula management			

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
0D.1.01	**A073** - Terminal (A4)	Vario terminal cannot open ISO bus screen	Not enough free memory, delete the existing ISO implement projects from the terminal		
0D.1.02	**A073** - Terminal (A4)	Terminal has not reported to the ISO bus for 10 seconds	Check wiring, restart tractor		
0D.1.03	**A073** - Terminal (A4)	Incorrect number of terminal buttons	Faulty display on the terminal		
0D.1.04	**A073** - Terminal (A4)	Incorrect terminal resolution	Faulty display on the terminal		
0D.1.05	**A073** - Terminal (A4)	ISO is active and 25 seconds after switching it on, no ISO bus terminal was found	No display on the terminal		
0D.1.06	**A055** - ECU, data transfer	ISO bus error on Vario-Doc (bus off)	No display on the terminal		
0D.1.07	**A055** - ECU, data transfer	ISO bus error on Vario-Doc (receiver buffer)	Faulty display on the terminal, restart tractor		
0D.1.08	**A055** - ECU, data transfer	ISO bus error on Vario-Doc (transmitter buffer)	Faulty display on the terminal, restart tractor		
0D.1.09	**A055** - ECU, data transfer	Control bus error on Vario-Doc (bus off)	Faulty display on the terminal, restart tractor		
0D.1.0A	**A055** - ECU, data transfer	Control bus error on Vario-Doc (receiver buffer)	Faulty display on the terminal, restart tractor		
0D.1.0B	**A055** - ECU, data transfer	Control bus error on Vario-Doc (transmitter buffer)	Faulty display on the terminal, restart tractor		
0D.1.0C	**A055** - ECU, data transfer	Control bus error on Vario-Doc (receiver buffer)	Faulty display on instrument panel, restart tractor		
0D.1.0D	**A055** - ECU, data transfer	Control bus error on Vario-Doc (transmitter buffer)	Faulty display on instrument panel, restart tractor		
0D.1.0E	**A055** - ECU, data transfer	Control bus error on Vario-Doc (receiver buffer)	Faulty programming, restart tractor		

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
0D.1.0F	**A055** - ECU, data transfer	Control bus error on Vario-Doc (transmitter buffer)	Possible faulty programming, restart tractor		
0D.1.10	**A055** - ECU, data transfer	Control bus error on Vario-Doc (receiver buffer)	Faulty parameterisation, restart tractor		
0D.1.11	**A055** - ECU, data transfer	Control bus error on Vario-Doc (transmitter buffer)	Faulty parameterisation, restart tractor		
0D.1.12	**A073** - Terminal (A4)	ISO bus mode could not be detected	No display on the terminal, restart tractor		
0D.1.13	**A055** - ECU, data transfer	Inconsistency in operating data	Meaningful system operation not possible, synchronisation (call up data)		
0D.1.14	**A055** - ECU, data transfer	Version number for operating data does not correspond with that of the application	Meaningful system operation not possible, synchronisation (call up data)		
0D.1.15	**A055** - ECU, data transfer	Function not activated in the firmware	Meaningful system operation not possible, replace hardware		
0D.1.17	**A055** - ECU, data transfer	Time not available or time (RTC) module faulty	Meaningful system operation not possible, replace hardware		
0D.1.18	**A055** - ECU, data transfer	Data level at 100%	No more entries possible, synchronisation (call up data)		
0D.1.19	**A055** - ECU, data transfer	Data configuration error	No more entries possible, synchronisation (call up data)		
0D.1.1A	**A055** - ECU, data transfer	Write operation to DataFlash not possible	No more entries possible, synchronisation (call up data)		
0D.1.22	**A055** - ECU, data transfer	EEPROM communication reporting fault upon data receipt	System operation not possible, potentially Replace hardware, restart tractor		

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
0D.1.23	**A055** - ECU, data transfer	EEPROM communication reporting fault upon data transmission	System operation not possible, potentially Replace hardware, restart tractor		
0D.1.24	**A055** - ECU, data transfer	EEPROM communication checksum error	System operation not possible, potentially Replace hardware, restart tractor		
0D.1.25	**A055** - ECU, data transfer	Watchdog error when communicating with EEPROM	System operation not possible, potentially Replace hardware, restart tractor		
0D.1.26	**A055** - ECU, data transfer	Bluetooth module error (parity)	Replace hardware, restart tractor		
0D.1.27	**A055** - ECU, data transfer	Bluetooth module error (framing)	Replace hardware, restart tractor		
0D.1.28	**A055** - ECU, data transfer	Bluetooth module error (overflow)	Replace hardware, restart tractor		
0D.1.2B	**A055** - ECU, data transfer	Communication error to clock	No time, replace hardware, restart tractor		
0D.1.2C	**A055** - ECU, data transfer	Time module (RTC) losing data/hardware faulty	Time module (RTC) losing data, replace hardware		
0D.1.2D	**A055** - ECU, data transfer	Internal time module (RTC) battery faulty/hardware faulty	Time module (RTC) losing data, replace hardware		
0D.1.2E	**A055** - ECU, data transfer	Hardware faulty	No time, replace hardware if necessary		
0D.1.2F	**A055** - ECU, data transfer	Data from time module (RTC) checked for plausibility at system start-up	Incorrect time, set time		
0D.1.30	**G001** - Battery 1	Supply voltage not in 8 V to 18 V range (for longer than 10 seconds)	Check power supply; possible system failure		

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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-

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
0D.1.31	**A055** - ECU, data transfer	Vario-Doc circuit board temperature higher than 60°C	Data transfer (via Bluetooth) not possible, allow tractor (roof area) to cool down		
0D.1.33	**A055** - ECU, data transfer	Break in Vario-Doc internal voltage; must be between 8 V and 12 V	System failure, replace hardware		
0D.1.34	ISO bus	ISO bus initialisation failed	System operation not possible, restart tractor		
0D.1.35	**A055** - ECU, data transfer	ISO application not operational. Internal fault in ISO bus driver	System operation not possible, restart tractor		
0D.1.36	**A073** - Terminal (A4)	Terminal does not answer the request for hardware information	System operation not possible, restart tractor		
0D.1.37	**A073** - Terminal (A4)	Terminal does not answer the request for number of buttons	System operation not possible, restart tractor		
0D.1.38	**A073** - Terminal (A4)	Terminal does not answer the request for available memory	System operation not possible, restart tractor		
0D.1.39	**A073** - Terminal (A4)	Screen deletion operation is not confirmed by the terminal	System operation not possible, restart tractor		
0D.1.3A	**A073** - Terminal (A4)	Terminal does not confirm the successful loading of screens from the terminal	System operation not possible, restart tractor		
0D.1.3B	**A073** - Terminal (A4)	Protocol error when uploading object pool or terminal does not confirm successful upload	System operation not possible, restart tractor		
0D.1.3C	**A073** - Terminal (A4)	Terminal reports fault when saving screens or does not respond to memory request	System operation not possible, restart tractor		
0D.1.3D	**A055** - ECU, data transfer **A073** - Terminal (A4)	ISO bus address request unsuccessful, probably no more free addresses in the permitted range	System operation not possible, restart tractor		

15 Fault code 0F.1.00 -

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
0F.1.00	**A038** - ECU, central electrical system	Unknown error in central electrical system			
0F.1.01	**E066** - Brake and tail light left	Function non-operable	Brake light, left dipped for night driving	Circuit diagram Vehicle licensing regulations/corner light Vehicle licensing regulations/work lights	
0F.1.02	**E067** - Brake and tail light right	Function non-operable	Brake light, right dipped for night driving	Circuit diagram Vehicle licensing regulations/corner light Vehicle licensing regulations/work lights	
0F.1.03	**E055** - Wide vehicle marker lights, left	Function non-operable		Circuit diagram Vehicle licensing regulations/work lights	
0F.1.04	**E054** - Wide vehicle marker lights, right	Function non-operable		Circuit diagram Vehicle licensing regulations/work lights	
0F.1.05	**E098** - Drive headlight (main beam), right **E100** - Drive headlight (main beam), left	Function non-operable		Circuit diagram Vehicle licensing regulations/corner light	
0F.1.06	**E099** - Drive headlight (dipped beam), right **E101** - Drive headlight (dipped beam), left	Function non-operable		Circuit diagram Vehicle licensing regulations/corner light	
0F.1.07	**E003** - H4 additional headlight, right **E004** - H4 additional headlight, left	Function non-operable		Circuit diagram Vehicle licensing regulations/corner light	
0F.1.08	**E003** - H4 additional headlight, right **E004** - H4 additional headlight, left	Function non-operable		Circuit diagram Vehicle licensing regulations/corner light	
0F.1.09	**E089** - Direction direction indicator, front left	Function non-operable		Circuit diagram Vehicle licensing regulations/work lights	

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
0F.1.0A	**E088** - Direction direction indicator, front right	Function non-operable		Circuit diagram Vehicle licensing regulations/work lights	
0F.1.0B	**E064** - Rear direction indicator, left	Function non-operable		Circuit diagram Wiper/work lights	
0F.1.0C	**E065** - Rear direction indicator, right	Function non-operable		Circuit diagram Wiper/work lights	
0F.1.10	**M003** - Wiper pump, front	Function non-operable		Circuit diagram Work lights/	
0F.1.11	**M005** - Wiper pump, rear	Function non-operable		Circuit diagram Work lights/	
0F.1.13	**A038** - ECU, central electrical system	Right or left side lights or licence plate lighting faulty			
0F.1.15	**A036** - Control panel, dashboard right/left	Left-hand side not working			
0F.1.16	**A036** - Control panel, dashboard right/left	Right-hand side not working			
0F.1.17	**E066** - Brake and tail light left	Function non-operable	Tail lamp, left switched for day driving	Circuit diagram Vehicle licensing regulations/corner light Vehicle licensing regulations/work lights	
0F.1.18	**E067** - Brake and tail light right	Function non-operable	Tail lamp, right switched for day driving	Circuit diagram Vehicle licensing regulations/corner light Vehicle licensing regulations/work lights	
0F.1.19	**A038** - ECU, central electrical system	Sensor supply voltage too high or too low	Wiper, water valve, fan, primary fan, work lights, hydraulic relay circuits 3 and 4, rear window heater, reverse operation and tank pump not working		
0F.1.1A	**A038** - ECU, central electrical system	Main supply voltage too high (>18V and 5 minutes)			
0F.1.1B	**A038** - ECU, central electrical system	Processor supply voltage too high or too low			

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
0F.1.1D	**M002** - Front wiper motor	Function non-operable		Circuit diagram Wiper/work lights	
0F.1.1E	**M004** - Rear wiper motor	Function non-operable		Circuit diagram Wiper/work lights	
0F.1.1F	**M010** - Fuel pump	Function non-operable		Circuit diagram Work lights/	
0F.1.20	**A050** - ECU, basic control unit **A007** - Instrument panel	Communication problem: no information from instrument panel			
0F.1.21	**A050** - ECU, basic control unit	Checksum error over address range			
0F.1.22	**A050** - ECU, basic control unit	Checksum error over address range for diagnostic parameters			
0F.1.23	**A050** - ECU, basic control unit	Communication problem: No information from transmission (engine speed, theoretical speed, reverse operation)			
0F.1.24	**A050** - ECU, basic control unit	Communication problem: no information from enhanced controls (brake)			
0F.1.25	**A039** - MFA, multifunction armrest **A050** - ECU, basic control unit	Communication problem: No information from MFA (3rd and 4th hydr. circuit buttons)			
0F.1.26	**A050** - ECU, basic control unit	Communication problem: no information from EHL task (steering angle)			
0F.1.27	**A038** - ECU, central electrical system	Checksum error over address range for central electrical system parameters			
0F.1.28	**A038** - ECU, central electrical system	Error on reading from EEPROM during initialisation			
0F.1.29	**A039** - MFA, multifunction armrest Button, hydraulic circuit 3	Faulty button, signal line fault			
0F.1.2A	**A039** - MFA, multifunction armrest Button, hydraulic circuit 4	Faulty button, signal line fault			

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
0F.1.2B	**A038** - ECU, central electrical system	Mirror heater faulty			
0F.1.2C	**A038** - ECU, central electrical system	Left reverse operation support valve inoperable			
0F.1.2D	**A038** - ECU, central electrical system	Right reverse operation support valve inoperable			
0F.1.2E	**M002** - Front wiper motor	Warning (end position timed out)	Wiper tries to restart		
0F.1.2F	**A038** - ECU, central electrical system	Initialisation error			
0F.1.30	**M004** - Rear wiper motor	Warning (end position timed out)	Wiper tries to restart		
0F.2.0D	**A038** - ECU, central electrical system **X018** - Rear socket	Trailer socket for left indicator faulty			
0F.2.0E	**A038** - ECU, central electrical system **X018** - Rear socket	Trailer socket for right indicator faulty			
0F.2.0F	**A038** - ECU, central electrical system **X018** - Rear socket	Trailer socket, terminal 54 faulty			
0F.2.14	**A038** - ECU, central electrical system **X018** - Rear socket	Left trailer socket, terminal 58 faulty			
0F.2.1C	**A038** - ECU, central electrical system **X018** - Rear socket	Right trailer socket, terminal 58 faulty			

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
10.1.31	**M015** - Actuator motor, top/middle air flap	Function non-operable		Circuit diagram Air conditioning/mirror/	
10.1.32	**M016** - Servomotor, bottom air valve	Function non-operable		Circuit diagram Air conditioning/mirror/	
10.1.33	**B074** - Sensor, internal temperature	Function non-operable		Circuit diagram Vehicle licensing regulations/work lights	
10.1.34	**Y024** - Magnetic clutch, air conditioning compressor	Function non-operable			
10.1.36	**B071** - Sensor, output temperature	Function non-operable	Air conditioning running in emergency mode		
10.1.37	**B074** - Sensor, internal temperature	Function non-operable	Air conditioning running in emergency mode	Circuit diagram Vehicle licensing regulations/work lights	
10.1.38	**A053** - ECU, air conditioning control Evaporator temperature sensor	Function non-operable	Air conditioning running in emergency mode		
10.1.39	**B076** - Sensor, external temperature	Function non-operable	Air conditioning running in emergency mode	Circuit diagram Vehicle licensing regulations/work lights	
10.1.3A	**A038** - ECU, central electrical system	Checksum error, air conditioning	Default parameters are read from flash		EOL programming
10.1.3B	**A038** - ECU, central electrical system **A053** - ECU, air conditioning controlEvaporator temperature sensor	Overheating protection or anti-blocking mechanism faulty			
10.1.3C	**B073** - Sensor, solar (irradiation)	Function non-operable	Default parameters are used	Circuit diagram Vehicle licensing regulations/work lights	
10.1.3D	**A038** - ECU, central electrical system **A053** - ECU, air conditioning control	Water valve stepper motor not working			
10.1.3E	**A038** - ECU, central electrical system **S035** - Switch, high-pressure/low-pressure (air conditioning system)	Malfunction			

17 Fault code 15.1.00 -

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
15.1.62	**Y065** - Raise suspension solenoid valve	Function non-operable		Circuit diagram Suspension/Auto-Guide	
15.1.63	**Y064** - Suspension load pressure/lowering solenoid valve	Function non-operable		Circuit diagram Suspension/Auto-Guide	
15.1.64	**A039** - MFA, multifunction armrest Button, raise suspension (VA suspension)	Faulty button, signal fault			
15.1.65	**A039** - MFA, multifunction armrest Lock suspension button, FA suspension	Faulty button, signal fault			
15.1.66	**Y012** - Oil pre-heater/load suspension solenoid valve	Function non-operable		Circuit diagram Hydraulics	
15.1.67	**B066** - Sensor, wheel position (left)	Sensor faulty, Signal fault		Circuit diagram Suspension/Auto-Guide	
		8.5 V supply	A013, fuse 17		
15.1.68	**B068** - Sensor, wheel position (right)	Sensor faulty, Signal fault		Circuit diagram Suspension/Auto-Guide	
		8.5 V supply	A013, fuse 09		
15.1.69	**Y063** - Wobble stabiliser solenoid valve	Function non-operable		Circuit diagram Suspension/Auto-Guide	
15.1.6A	**Y067** - Lock suspension solenoid valve	Solenoid valve faulty, actuation fault		Circuit diagram Suspension/Auto-Guide	
15.1.6B	**Y067** - Lock suspension solenoid valve	Solenoid valve faulty, Actuation fault		Circuit diagram Suspension/Auto-Guide	

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
15.1.6C	**B066** - Sensor, wheel position (left) **B068** - Sensor, wheel position (right)	Position sensor not calibrated		Calibration code "7666"	
15.1.6D	**A050** - ECU, basic control unit	Checksum error, suspension			EOL programming
15.1.6E	**B066** - Sensor, wheel position (left) **B068** - Sensor, wheel position (right)	Plausibility error		Circuit diagram Suspension/Auto-Guide	

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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-

18 Fault code 18.1.00 -

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
18.1.01	**A039** - MFA, multifunction armrest Auto-Guide partial activation button	Partial activation button in MFA faulty, Signal fault			
18.1.02	**A039** - MFA, multifunction armrest Auto-Guide full activation button	Full activation button in MFA faulty, Signal fault			
18.1.03	**A039** - MFA, multifunction armrest	MFA fails to report			
18.1.06	**A039** - MFA, multifunction armrest Seat switch	Seat switch faulty, Signal fault			
18.1.07	**Y085** - Pilot pressure/switch-off solenoid valve (Auto-Guide)	Steering wheel shut off valve faulty, Signal fault		Circuit diagram Suspension/Auto-Guide	
18.1.08	**Y086** - Solenoid valve, steering disconnect (Auto-Guide)	Pilot pressure valve faulty, Signal fault		Circuit diagram Suspension/Auto-Guide	
18.1.1A	**B067** - Sensor, steering angle	Steering angle sensor faulty, Signal fault			
18.1.1C	**B067** - Sensor, steering angle	Invalid calibration values for steering angle sensor in EEPROM		Calibration code "2401" Calibration code "2403"	
18.1.2A	**B081** - Steering wheel sensor (360°)	Steering wheel sensor faulty, Signal value faulty			
		12 V supply	A013, fuse 29		
18.1.2C	**B081** - Steering wheel sensor (360°)	Invalid calibration values for steering wheel sensor in EEPROM			
18.1.30	**Y087** - Steering valve block, Auto-Guide	Unknown error from steering valve			
18.1.31	**Y087** - Steering valve block, Auto-Guide	Error with supply voltage from steering valve			
18.1.32	**Y087** - Steering valve block, Auto-Guide	Warning for steering valve actuator position			
18.1.33	**Y087** - Steering valve block, Auto-Guide	Error with steering valve actuator position			

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
18.1.34	**Y087** - Steering valve block, Auto-Guide	Error with steering valve actuation			
18.1.35	**Y087** - Steering valve block, Auto-Guide	Error with steering valve hard-ware			
18.1.36	**Y087** - Steering valve block, Auto-Guide	Warning regarding FLASH, EEPROM and software for steer-ing valve			
18.1.37	**Y087** - Steering valve block, Auto-Guide	Error regarding FLASH, EEPROM and software for steering valve			
18.1.3A	**Y087** - Steering valve block, Auto-Guide	No response from valve			
18.1.3B	**Y087** - Steering valve block, Auto-Guide	Steering valve does not return to neutral on switch-off			
18.1.3C	**Y087** - Steering valve block, Auto-Guide	Invalid calibration values for steer-ing valve in EEPROM			
18.1.4A	**A050** - ECU, basic control unit	Communication with TopDock interrupted	Last steering command is retained		
18.1.5C	**A050** - ECU, basic control unit	Invalid parameters for controller in EEPROM			EOL programming
18.1.66	**Y087** - Steering valve block, Auto-Guide	Wire for flow measurement bro-ken or short circuited			
18.1.69	**Y087** - Steering valve block, Auto-Guide	Supply voltage > 32 V			
18.1.6A	**Y087** - Steering valve block, Auto-Guide	Supply voltage < 10 V			
18.1.6B	**Y087** - Steering valve block, Auto-Guide	Actuator cannot reach neutral			
18.1.6C	**Y087** - Steering valve block, Auto-Guide	Actuator not in neutral during "RUNUP"			
18.1.6D	**Y087** - Steering valve block, Auto-Guide	Actuator position greater than ref-erence position			
18.1.7F	**Y087** - Steering valve block, Auto-Guide	EHL system error			

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
18.2.05	**A039** - MFA, multifunction armrest Seat switch	Seat not "loaded" when steering is activated			
18.2.40	**A050** - ECU, basic control unit	Warning message when attempting full activation — no connection			
18.2.70	**Y087** - Steering valve block, Auto-Guide	Warning message when ISO is inactive			

19 Fault code 1E.1.00 -

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
If the following errors occur (1E.1…), they must be deleted in the engine control unit following error correction with SERDIA!					
1E.1.00	**A051** - ECU, engine control unit (EDC 7).	Original error, Deutz			SERDIA **(delete error)**
1E.1.01	**G001** - Battery 1	Input, battery, battery voltage outside setpoint range	Start not possible		SERDIA (delete error) FC:0016, 0017
1E.1.02	**B092** - Sensor, charge air pressure/temperature	Cable break or short circuit. Boost pressure outside setpoint range	Reduced power	Circuit diagram KHD engine control	SERDIA (delete error) FC:0020, 0021
1E.1.03	**B092** - Sensor, charge air pressure/temperature	Cable break or short circuit. Charge air temperature above setpoint value	Reduced power	Circuit diagram KHD engine control	SERDIA (delete error) FC:0095, 0096
1E.1.04	**B089** - Engine temperature sensor (Deutz)	Coolant temperature sensor: break in wiring or short circuit. Coolant temperature outside setpoint area		Circuit diagram KHD engine control	SERDIA (delete error) FC:0037, 0038
1E.1.06	**B085** - Camshaft speed sensor **B088** - Crankshaft speed sensor	Camshaft sensor faulty or no signal; Crankshaft sensor faulty or no signal; camshaft/crankshaft speed signals out of phase	Starting possible after prolonged unsuccessful attempt, engine runs "rough"	Circuit diagram KHD engine control	SERDIA (delete error) 004B, 004C, 004D, 004E, FC:004F, 0050
1E.1.07	**B091** - Sensor, water in fuel	Cable break or short circuit Water level above setpoint range	Drain water from fuel filter	Circuit diagram KHD engine control	SERDIA (delete error) FC:0057, 0059
1E.1.08	**B087** - Fuel low pressure sensor	Cable break or short circuit Fuel low pressure outside setpoint rage	Check fuel system, possible air in system or fuel filter clogged	Circuit diagram KHD engine control	SERDIA (delete error) FC:005A, 005B, 005E
1E.1.0A	**A039** - MFA, multifunction armrest Potentiometer, hand throttle	Cable break or short circuit Idle sensor signal not plausible			SERDIA (delete error) FC:008A
1E.1.0E	**B090** - Sensor, oil pressure	Cable break or short circuit. Oil pressure outside of setpoint range		Circuit diagram KHD engine control	SERDIA (delete error) FC:00C4, 00C5, 00C6, 00C7

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
1E.1.12	**S002** - Switch, ignition	Pin 50, Ignition starter switch sticking		Circuit diagram EDC engine control	SERDIA (delete error) 00E3, 00E4
1E.1.14	**B055** - Sensor, foot throttle	Cable break or short circuit Signal does not match idle sensor signal	Speed maintained, can be used by hand throttle by increasing speed briefly	Circuit diagram EDC engine control	SERDIA (delete error) FC:000C, 000E, 000F
1E.1.21	**K063** - Heater flange relay	Cable break or short circuit	Pre-heater inoperable	Circuit diagram KHD engine control	SERDIA (delete error) FC:0021
1E.1.22	**K063** - Heater flange relay	Break in wiring or incorrectly connected	Pre-heater inoperable	Circuit diagram KHD engine control	SERDIA (delete error) FC:0013,0014
1E.1.23	**S047** - Switch, engine brake	Cable break or short circuit		Circuit diagram EDC engine control	SERDIA (delete error) FC:0034
1E.1.24	**Y006** - Solenoid valve, engine brake	Faulty valve, faulty actuation			SERDIA (delete error) FC:004A
1E.1.25	**Y006** - Solenoid valve, engine brake	Cable break or short circuit			SERDIA (delete error) FC:0052
1E.1.26	**A051** - ECU, engine control unit (EDC 7). **B077** - Engine fan (speed sensor/magnetic clutch)	Cable break or short circuit		Circuit diagram EDC engine control	SERDIA (delete error) FC:0053
1E.1.27	**A051** - ECU, engine control unit (EDC 7). **B077** - Engine fan (speed sensor/magnetic clutch) **Y091** - Dispensing unit (fuel)	Cable break, short circuit or internal fault in engine control unit between engine control unit and dispensing unit	Start not possible	Circuit diagram KHD engine control	SERDIA (delete error) FC:00B6, 00B7, 00BA, 00BC
1E.1.2C	**K065** - Starter relay	Cable break or short circuit	Start not possible	Circuit diagram EDC engine control	SERDIA (delete error) FC:00DF, 00E0
1E.1.30	**B004** - Vacuum switch (air filter)	Pressure loss above setpoint range	Loss of power Clean/replace air filter	Circuit diagram EDC engine control	SERDIA (delete error) FC:000B, 00F2

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
1E.1.34	**S034** - Switch, coolant level	Coolant outside of setpoint level	Check coolant level	Circuit diagram EDC engine control	SERDIA (delete error) FC:0025
1E.1.37	**A051** - ECU, engine control unit (EDC 7).	Fan speed exceeds target range			SERDIA (delete error)
1E.1.3A	**A051** - ECU, engine control unit (EDC 7).	Misfiring			SERDIA (delete error) FC:002F
1E.1.50	**Y091** - Dispensing unit (fuel)	Dispensing unit not connected, short circuit to battery or earth	Message that the engine stops after approx. 5 minutes appears	Circuit diagram KHD engine control	SERDIA (delete error) FC:00B0, 00B1, 00B2, 00B3
1E.1.51	**B086** - Rail pressure sensor Mechanical rail pressure limiting valve	Cut-off valve, rail pressure fails to open	Message that the engine stops after approx. 5 minutes appears		SERDIA (delete error) FC:00D0, 00EC
1E.1.52	**B086** - Rail pressure sensor	Cable break or short circuit	Message that the engine stops after approx. 5 minutes appears	Circuit diagram KHD engine control	SERDIA (delete error) FC:00D1, 00D2
1E.1.53	**B086** - Rail pressure sensor	Rail pressure outside setpoint range	Message that the engine stops after approx. 5 minutes appears	Circuit diagram KHD engine control	SERDIA (delete error) FC:00D3, 00D4, 00D5, 00D6, 00D7, 00D8
1E.1.54	**B086** - Rail pressure sensor	Compression test active	Rail pressure monitoring deactivated		SERDIA (delete error) FC:00AF
1E.1.60	**A051** - ECU, engine control unit (EDC 7).	Misfiring on several cylinders			SERDIA (delete error) FC:002E
1E.1.61	**A051** - ECU, engine control unit (EDC 7).	Misfiring on cylinder 1			SERDIA (delete error) FC:0026
1E.1.62	**A051** - ECU, engine control unit (EDC 7).	Misfiring on cylinder 2			SERDIA (delete error) FC:0027

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-

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
1E.1.63	**A051** - ECU, engine control unit (EDC 7).	Misfiring on cylinder 3			SERDIA (delete error) FC:0028
1E.1.64	**A051** - ECU, engine control unit (EDC 7).	Misfiring on cylinder 4			SERDIA (delete error) FC:0029
1E.1.65	**A051** - ECU, engine control unit (EDC 7).	Misfiring on cylinder 5			SERDIA (delete error) FC:002A
1E.1.66	**A051** - ECU, engine control unit (EDC 7).	Misfiring on cylinder 6			SERDIA (delete error) FC:002B
1E.1.70	**A051** - ECU, engine control unit (EDC 7).	Start of injection period in cylinder 1 outside setpoint range or absent.			SERDIA (delete error) FC:0018
1E.1.71	**A051** - ECU, engine control unit (EDC 7).	Start of injection period in cylinder 2 outside setpoint range or absent.			SERDIA (delete error) FC:0019
1E.1.72	**A051** - ECU, engine control unit (EDC 7).	Start of injection period in cylinder 3 outside setpoint range or absent.			SERDIA (delete error) FC:001A
1E.1.73	**A051** - ECU, engine control unit (EDC 7).	Start of injection period in cylinder 4 outside setpoint range or absent.			SERDIA (delete error) FC:001B
1E.1.74	**A051** - ECU, engine control unit (EDC 7).	Start of injection period in cylinder 5 outside setpoint range or absent.			SERDIA (delete error) FC:001C
1E.1.75	**A051** - ECU, engine control unit (EDC 7).	Start of injection period in cylinder 6 outside setpoint range or absent.			SERDIA (delete error) FC:001D
1E.1.78	**A051** - ECU, engine control unit (EDC 7).	Short circuit in cylinder bank 1 injector valves	Cylinder switch-off		SERDIA (delete error) FC:0099
1E.1.79	**A051** - ECU, engine control unit (EDC 7).	Break in wiring of cylinder bank 1 injector valves	Cylinder switch-off		SERDIA (delete error) FC:009A

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
1E.1.7A	**A051** - ECU, engine control unit (EDC 7).	Short circuit in cylinder bank 2 injector valves	Cylinder switch-off		SERDIA (delete error) FC:009B
1E.1.7B	**A051** - ECU, engine control unit (EDC 7).	Break in wiring of cylinder bank 2 injector valves	Cylinder switch-off		SERDIA (delete error) FC:009C
1E.1.7C	**A051** - ECU, engine control unit (EDC 7).	Short circuit or break in wiring to injector valve 1	Injection failure		SERDIA (delete error) FC:00A0, 009F
1E.1.7D	**A051** - ECU, engine control unit (EDC 7).	Short circuit or break in wiring to injector valve 2	Injection failure		SERDIA (delete error) FC:00A1, 00A2
1E.1.7E	**A051** - ECU, engine control unit (EDC 7).	Short circuit or break in wiring to injector valve 3	Injection failure		SERDIA (delete error) FC:00A3, 00A4
1E.1.7F	**A051** - ECU, engine control unit (EDC 7).	Short circuit or break in wiring to injector valve 4	Injection failure		SERDIA (delete error) FC:00A5, 00A6
1E.1.80	**A051** - ECU, engine control unit (EDC 7).	Short circuit or break in wiring to injector valve 5	Injection failure		SERDIA (delete error) FC:00A7, 00A8
1E.1.81	**A051** - ECU, engine control unit (EDC 7).	Short circuit or break in wiring to injector valve 6			SERDIA (delete error) FC:00A9, 00AA
1E.1.90	**Y094** - Actuator unit, AGR (exhaust gas recirculation)	Short circuit to battery, earth, break in wiring or short circuit	Reduction in power		SERDIA (delete error) FC:0045, 0046, 0047, 0048
1E.1.B0	**A051** - ECU, engine control unit (EDC 7).	CAN message, no throttle pedal or outside setpoint range		Circuit diagram EDC engine control	SERDIA (delete error) FC:005E
1E.1.B1	**A051** - ECU, engine control unit (EDC 7).	CAN message, no control function mode		Circuit diagram EDC engine control	SERDIA (delete error) FC:005F

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
1E.1.B2	**A051** - ECU, engine control unit (EDC 7).	CAN message, no engine protection mechanism		Circuit diagram EDC engine control	SERDIA (delete error) FC:006A
1E.1.B3	**A051** - ECU, engine control unit (EDC 7).	CAN message, no pre-heater or engine command		Circuit diagram EDC engine control	SERDIA (delete error) FC:006E
1E.1.B5	**A051** - ECU, engine control unit (EDC 7).	No engine temperature CAN message		Circuit diagram EDC engine control	SERDIA (delete error) FC:0071
1E.1.B6	**A051** - ECU, engine control unit (EDC 7).	No switch outputs CAN message		Circuit diagram EDC engine control	SERDIA (delete error) FC:0075
1E.1.B8	**A051** - ECU, engine control unit (EDC 7).	CAN-message missing		Circuit diagram EDC engine control	SERDIA (delete error) FC:0078
1E.1.B9	**A051** - ECU, engine control unit (EDC 7).	CAN-message missing		Circuit diagram EDC engine control	SERDIA (delete error) FC:0079
1E.1.BA	**A051** - ECU, engine control unit (EDC 7).	CAN-message missing		Circuit diagram EDC engine control	SERDIA (delete error) FC:007A
1E.1.BB	**A051** - ECU, engine control unit (EDC 7).	CAN-message missing		Circuit diagram EDC engine control	SERDIA (delete error) FC:007B
1E.1.BC	**A051** - ECU, engine control unit (EDC 7).	CAN-message missing		Circuit diagram EDC engine control	SERDIA (delete error) FC:007C
1E.1.BD	**A051** - ECU, engine control unit (EDC 7).	CAN-message missing		Circuit diagram EDC engine control	SERDIA (delete error) FC:007D
1E.1.BE	**A051** - ECU, engine control unit (EDC 7).	CAN-message missing		Circuit diagram EDC engine control	SERDIA (delete error) FC:007E
1E.1.BF	**A051** - ECU, engine control unit (EDC 7).	CAN-message missing		Circuit diagram EDC engine control	SERDIA (delete error) FC:007F

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
1E.1.C0	**A051** - ECU, engine control unit (EDC 7).	CAN-message missing		Circuit diagram EDC engine control	SERDIA (delete error) FC:0080
1E.1.C1	**A051** - ECU, engine control unit (EDC 7).	CAN bus times out with at least one sent message		Circuit diagram EDC engine control	SERDIA (delete error) FC:0083
1E.1.C2	**A051** - ECU, engine control unit (EDC 7).	CAN bus A, cable break or short circuit	Driving with foot throttle possible	Circuit diagram EDC engine control	SERDIA (delete error) FC:00C0
1E.1.C3	**A051** - ECU, engine control unit (EDC 7).	CAN bus B, cable break or short circuit	Driving with foot throttle possible	Circuit diagram EDC engine control	SERDIA (delete error) FC:00C1
1E.1.C4	**A051** - ECU, engine control unit (EDC 7).	CAN bus C, cable break or short circuit	Driving with foot throttle possible	Circuit diagram EDC engine control	SERDIA (delete error) FC:00C2
1E.1.D0	**A051** - ECU, engine control unit (EDC 7).	Faulty external pressure sensor			SERDIA (delete error) FC:0010
1E.1.D1	**A051** - ECU, engine control unit (EDC 7).	Faulty engine control unit			SERDIA (delete error) FC:008D
1E.1.D2	**A051** - ECU, engine control unit (EDC 7).	EEPROM memory access Possible cause of fault: **S092** - Battery disconnect switch Activated too early		Load new operating software Wait at least 45 sec.	SERDIA (delete error) FC:008E
1E.1.D3	**A051** - ECU, engine control unit (EDC 7).	High current output injector A (High)		If error cannot be deleted, replace control unit	SERDIA (delete error) FC:009D
1E.1.D4	**A051** - ECU, engine control unit (EDC 7).	High current output injector B (High)		If error cannot be deleted, replace control unit	SERDIA (delete error) FC:009E
1E.1.D5	**A051** - ECU, engine control unit (EDC 7).	Faulty engine control			SERDIA (delete error) FC:00B8

Fault code	DIN brief description	Cause	Consequences	Reference	FENDIAS/Note
1E.1.D6	**A051** - ECU, engine control unit (EDC 7).	Engine monitoring system overloaded			SERDIA (delete error) FC:00DA
1E.1.D7	**A051** - ECU, engine control unit (EDC 7).	Incorrect voltage for internal 5 V reference source 1 (Supply from: B090, B092)		Check the supply and signal of the sensors	SERDIA (delete error) FC:00DB
1E.1.D8	**A051** - ECU, engine control unit (EDC 7).	Incorrect voltage for internal 5 V reference source 2 (Supply from: B055, B077, B087)		Check the supply and signal of the sensors	SERDIA (delete error) FC:00DD
1E.1.D9	**A051** - ECU, engine control unit (EDC 7).	Incorrect voltage for internal 5 V reference source 3 (Supply from: B055, B086)		Check the supply and signal of the sensors	SERDIA (delete error) FC:00DE
1E.1.DB	**A051** - ECU, engine control unit (EDC 7).	Faulty serial communication interface			SERDIA (delete error) FC:00EB
1E.1.F0	**A051** - ECU, engine control unit (EDC 7).	Manipulation protection Torque envelope curve manipulation detected	Reduction in power		SERDIA (delete error) FC:00EF

20 Calibration fault codes

Fault code during calibration on FENDT 900 Vario COM III

*Calibration code 1001 (**A039** - MFA, multifunction armrest crossgate lever)*

Fault code	Cause
F01	Preliminary conditions for calibration not satisfied
F02	Calibrated values are faulty
F03	**A039** - MFA, multifunction armrest not responding
F08	Calibration taking too long (more than 30 seconds)
F09	User terminated calibration with "ESC"

*Calibration code 1003 (**A039** - MFA, multifunction armrest linear module 1 (internal))*

Fault code	Cause
F01	Preliminary conditions for calibration not satisfied
F02	Calibrated values are faulty
F03	**A039** - MFA, multifunction armrest not responding
F08	Calibration taking too long (more than 30 seconds)
F09	User terminated calibration with "ESC"

*Calibration code 1004 (**A039** - MFA, multifunction armrest linear module 2)*

Fault code	Cause
F01	Preliminary conditions for calibration not satisfied
F02	Calibrated values are faulty
F03	**A039** - MFA, multifunction armrest not responding
F08	Calibration taking too long (more than 30 seconds)
F09	User terminated calibration with "ESC"

*Calibration code 1005 (**A039** - MFA, multifunction armrest linear module 3)*

Fault code	Cause
F01	Preliminary conditions for calibration not satisfied
F02	Calibrated values are faulty
F03	**A039** - MFA, multifunction armrest not responding
F08	Calibration taking too long (more than 30 seconds)
F09	User terminated calibration with "ESC"

*Calibration code 1006 (**A039** - MFA, multifunction armrest linear module 4 (external))*

Fault code	Cause
F01	Preliminary conditions for calibration not satisfied
F02	Calibrated values are faulty
F03	**A039** - MFA, multifunction armrest not responding
F08	Calibration taking too long (more than 30 seconds)
F09	User terminated calibration with "ESC"

*Calibration code 2401 (**B067** - Sensor, steering angle)*

Fault code	Cause
F01	Preliminary conditions for calibration not satisfied
F08	Calibration taking too long (more than 30 seconds)
F09	User terminated calibration with "ESC"
F10	Plausibility of "centre position" calibration value
F11	Plausibility of "left stop" calibration value
F12	Plausibility of "right stop" calibration value
F13	Plausibility of calibration values with each other

*Calibration code 2403 (**Y087** - Steering valve block, Auto-Guide)*

Fault code	Cause
F01	Preliminary conditions for calibration not satisfied
F02	Front wheels are not straight
F03	Manual steering wheel actuation during calibration
F06	No movement in direction "steering to left"
F07	No movement in direction "steering to right"
F08	Calibration taking too long
F09	User terminated calibration with ESC
F11	Plausibility: Signal in direction "steering to left"
F12	Plausibility: Signal in direction "steering to right"

*Calibration code 4001 (**B017** - Sensor, clutch pedal)*

Fault code	Cause
F01	User terminated calibration with "ESC"
F02	Pedal in rest position: Signal greater than allowed (22 mA)
F03	Pedal in rest position: Signal smaller than allowed (2 mA)
F04	Pedal fully depressed: Signal greater than allowed (22 mA)
F05	Pedal fully depressed: Signal smaller than allowed (2 mA)
F06	Calibrated min. and max. values are too close together Minimum difference of 10 mA necessary
F07	Calibration taking too long (more than 30 seconds)

*Calibration code 4002 (**A039** - MFA, multifunction armrest)*

Fault code	Cause
F02	Calibrated values are faulty
F03	**A039** - MFA, multifunction armrest not responding
F08	Calibration taking too long (more than 30 seconds)
F09	User terminated calibration with "ESC"

*Calibration code 4003 (**B016** - Sensor, travel range detection)*

Fault code	Cause
F01	User terminated calibration with "ESC"
F02	Speed above 0,1 Km/h
F03	Engine speed below 600 rpm
F04	Engine speed above 900 rpm
F05	Transmission not in neutral
F06	Clutch not depressed
F07	**B015** - Sensor, bevel pinion faulty
F08	**B014** - Sensor, collecting shaft faulty
F09	**B010** - Sensor, engine speed faulty
F10	Neutral switch, driving switch faulty (**A039** - MFA, multifunction armrest)
F11	**B016** - Sensor, travel range detection faulty
F12	**Y002** - Solenoid valve, travel range I faulty
F13	**Y003** - Solenoid valve, travel range II faulty
F20	Calibrated values for neutral position incorrect
F21	Calibrated values for travel range I incorrect
F22	Calibrated values for travel range II incorrect
F23	Calibrated values do not match
F30	Error reading from EEPROM (**A050** - ECU, basic control unit)
F31	Error while writing to EEPROM (**A050** - ECU, basic control unit)

*Calibration code 4005 (**B055** - Sensor, foot throttle)*

Fault code	Cause
F21	Transmission in "ACTIVE STATIONARY". (Remedy: Put transmission into neutral)
F22	Signal smaller than 3 mA
F23	Signal larger than 21 mA
F24	Rotation angle of **B055** - Sensor, foot throttle is too great (more than 250 steps)
F25	Distance between idle and full throttle too short (smaller than 12 mA) or **B055** - Sensor, foot throttle incorrectly calibrated
F26	Distance between idle and full throttle too short (less than 70%) or **B055** - Sensor, foot throttle incorrectly calibrated
F27	Time for a calibration increment exceeded (longer than 60 seconds)
F28	Internal error in the **A050** - ECU, basic control unit. Error while saving the calibrated value in the EEPROM (EOL reprogramming may be necessary)

*Calibration code 4007 (**A009** - Actuator unit)*

Fault code	Cause
F02	**A009** - Actuator unit reporting a fault Frequent cause of fault: During previous fault-generated calibration exit, no "Key reset (ignition OFF/ON)" was carried out
F03	**A009** - Actuator unit fails to control the specified value exactly. Check that the transmission adjustment is smooth.
F04	Transmission ratio adjustment not effected within 8 sec. Check that the transmission adjustment is smooth.
F05	Step 1 = **A009** - Actuator unit does not find neutral point 0 in forwards direction. Step 2 = **A009** - Actuator unit does not find neutral point 0 in reverse direction. Check connection of **A009** - Actuator unit to actuator shaft.
F06	See under error message F05
F07	Step 2: The neutral points of the transmission control system for forwards and reverse travel are too far apart, more than 8°. Check connection of **A009** - Actuator unit to actuator shaft.
F08	Step 3: Max. transmission ratio forward point not found. Specified value min. 155°, max. 187° Step 4: Max. transmission ratio reverse point not found. Specified value min. 136°, max. 165° Check connection of **A009** - Actuator unit to actuator shaft.
F09	Step 3: Forward actuator shaft adjustment greater than 155°. but transmission adjustment reacts less than 155° Step 4: Reverse actuator shaft adjustment greater than 135°. but transmission adjustment reacts below 135° Check connection of **A009** - Actuator unit to actuator shaft.
F10	Transmission ratio characteristic not logical, e.g. shifted forward and reverse detected. Repeat calibration. See also error message F 2. Check rotational direction signal from **B014** - Sensor, collecting shaft
F11/12	Step 7: check Step 1 to Step 6 values. ML transmission ratio not OK. Repeat calibration. See also error message F 2. Then check hydrostatic power branch, e.g. via emergency operation.
F13	1. EOL programmed incorrectly (prior to Step 1) 2. Values stored in the **A050** - ECU, basic control unit are illogical Remedy: 1. Reprogram EOL. 2. See 1. Replace **A050** - ECU, basic control unit if necessary
F14	See F 11/F 12
F15	Maximum forward and/or reverse transmission ratio not achieved. Remedy: Repeat calibration (see also F2). Then check hydraulic power distribution system if necessary, e.g. via emergency mode.
F50	User interrupted with "ESC"
F51	Speed above 0,1 km/h
F52	Engine speed below 1400 rpm
F53	Handbrake not applied
F54	Faulty speed signal from **B015** - Sensor, bevel pinion
F55	Faulty speed signal from **B014** - Sensor, collecting shaft
F56	Faulty speed signal from **B010** - Sensor, engine speed
F57	Clutch pedal depressed
F58	**B017** - Sensor, clutch pedal faulty
F59	Travel range I button was actuated
F60	Travel range I button faulty
F61	Travel range II button was actuated

Fault code	Cause
F62	Travel range II button faulty
F63	Range control I/II is not in neutral - Range selector in neutral (normal after calibration of the travel range selector (code 4003)) - Manually set the transmission to neutral via the emergency operation if necessary
F64	Electrical fault in **Y005** - Solenoid valve, speed governor

*Calibration code 4009 (**Y004** - Solenoid valve, turbo-clutch)*

Fault code	Cause
F01	User terminated calibration with ESC
F02	Calibration in emergency mode not possible
F03	Internal error in the **A050** - ECU, basic control unit: Error while saving the calibrated value in the EEPROM (EOL reprogramming may be necessary)
F04	Road speed greater than 0.1 [km/h].
F05	Engine speed too low when starting calibration Nominal engine speed = 1100 +/- 40 rpm
F06	Engine speed too low during calibration Nominal engine speed = 1100 +/- 400 rpm
F07	**B010** - Sensor, engine speed faulty
F08	Driving range II not engaged
F09	**B016** - Sensor, travel range detection faulty
F10	Transmission not in neutral
F11	Neutral button faulty (**A039** - MFA, multifunction armrest)
F12	Clutch pedal depressed
F13	**B017** - Sensor, clutch pedal faulty
F14	Transmission pressure too high when starting calibration (above 100 [bar])
F15	Transmission pressure too high when starting calibration (above 200 [bar])
F16	**B008** - Sensor, high-pressure 1 faulty
F17	**S015** - Switch, hand brake faulty
F18	Handbrake not applied
F19	Fault in **A009** - Actuator unit
F20	Fault in **Y004** - Solenoid valve, turbo-clutch
F21	Plausibility error: Power consumption of **Y004** - Solenoid valve, turbo-clutch to transmission high pressure illogical
F22	Error in transmission ratio
F23	Plausibility error: Power consumption of **Y004** - Solenoid valve, turbo-clutch illogical (e.g. short circuit)

*Calibration code 4010 (**A039** - MFA, multifunction armrest)*

Fault code	Cause
F01	Preliminary conditions for calibration not satisfied
F02	Calibrated value of the current actuator position is invalid
F03	**A039** - MFA, multifunction armrest not responding
F08	Calibration taking too long (more than 30 seconds)
F09	User terminated calibration with ESC

*Calibration code 7666 (**B066** - Sensor, wheel position (left) **B068** - Sensor, wheel position (right))*

Fault code	Cause
F01	User terminated calibration with ESC
F02	Raising the suspension takes too long (longer than 40 seconds)
F03	Lowering the suspension takes too long (longer than 40 seconds)
F04	Calibrated min. and max. values are too close together
F05	Internal error in the **A050** - ECU, basic control unit:Error while saving calibrated values in EEPROM (EOL reprogramming may be necessary)
F06	Engine speed too low
F07	Road speed too high (more than 0.1 [km/h])

*Calibration code 8001 (**A039** - MFA, multifunction armrest)*

Fault code	Cause
F01	Preliminary conditions for calibration not satisfied
F02	Calibrated values are invalid
F03	**A039** - MFA, multifunction armrest not responding
F08	Calibration takes too long (more than 60 seconds)
F09	User terminated calibration with "ESC"

*Calibration code 9001 (**A039** - MFA, multifunction armrest)*

Fault code	Cause
F01	Preliminary conditions for calibration not satisfied
F02	Calibrated values are invalid
F03	**A039** - MFA, multifunction armrest not responding
F08	Calibration taking too long (more than 30 seconds)
F09	User terminated calibration with "ESC"

Calibration of tyre circumference

Fault code	Cause
F01	Calculated tyre circumference is too small
F02	Calculated tyre circumference is too large
F03	Calculated impulse total per metre of travelling distance too small for radar sensor
F04	Calculated impulse total per metre of travelling distance too large for radar sensor
F06	Internal error in the **A050** - ECU, basic control unit: Error while saving the calibrated value in the EEPROM (EOL reprogramming may be necessary)

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

D

Component position

D Component position

1 Electrical/electronic components - A 125
2 Electrical/electronic components - B 130
3 Electrical/electronic components - E 142
4 Electrical/electronic components - G 148
5 Electrical/electronic components - H 149
6 Electrical/electronic components – K 150
7 Electrical/electronic components - M 152
8 Electrical/electronic components - S 155
9 Electrical/electronic components – U 162
10 Electrical/electronic components - X 163
11 Electrical/electronic components - Y 195
12 Hydraulic components 203

1 Electrical/electronic components - A

A007 - Instrument panel

Cab, at top in steering column unit

Fig. 1. I001023

A009 - Actuator unit

Right side of tractor, on gearbox

Detach right rear wheel and panel

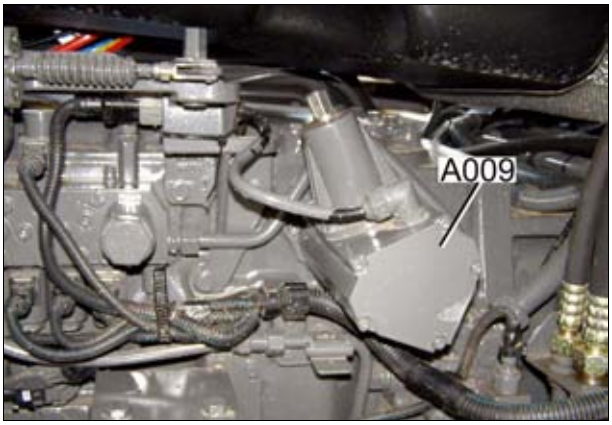


Fig. 2. I001024

A011 - Radar sensor

Left-hand tractor underside, at clutch housing

Disassemble from underneath

Fig. 3. I002938

A013 - PCB, microfuses

Cab, right mudguard, top

Detach cover

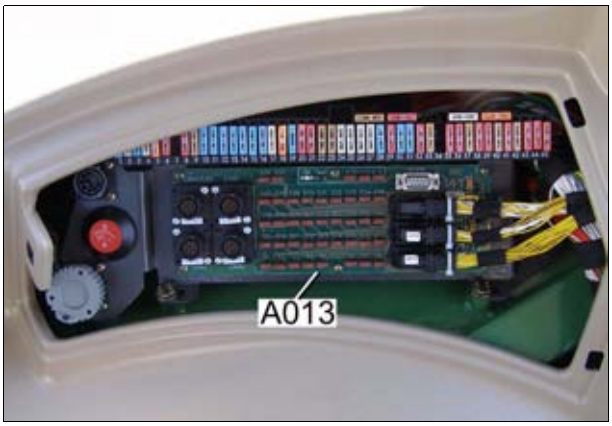


Fig. 4. I001142

A015 - Radio

Cab, right in roof

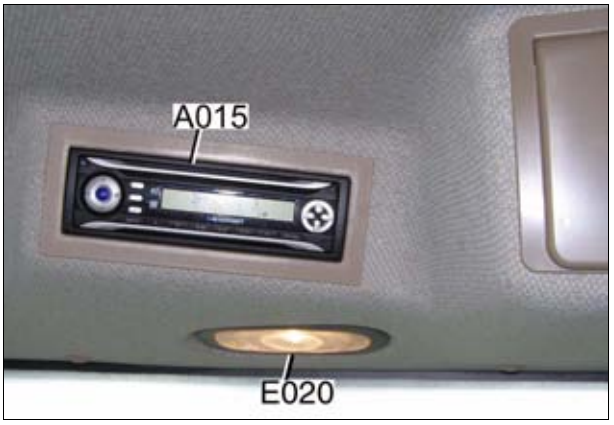


Fig. 5. I001025

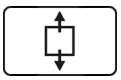
A036 - Control panel, dashboard right/left

Cab, on steering column

Fig. 6. I007383

A038 - ECU, central electrical system

Cab, right mudguard at bottom



Detach panel

Fig. 7. I001028

A039 - MFA, multifunction armrest

Cab, on right driver seat

Fig. 8. I001029

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-

A050 - ECU, basic control unit

Cab, right mudguard at bottom

Detach panel

Fig. 9. I001030

A051 - ECU, engine control unit (EDC 7).

Bulkhead between engine and cab

Open bonnet.

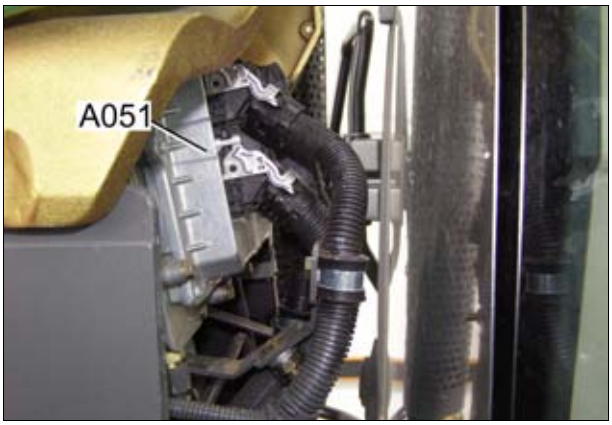


Fig. 10. I001150

A053 - ECU, air conditioning control

Below cab

Remove cab

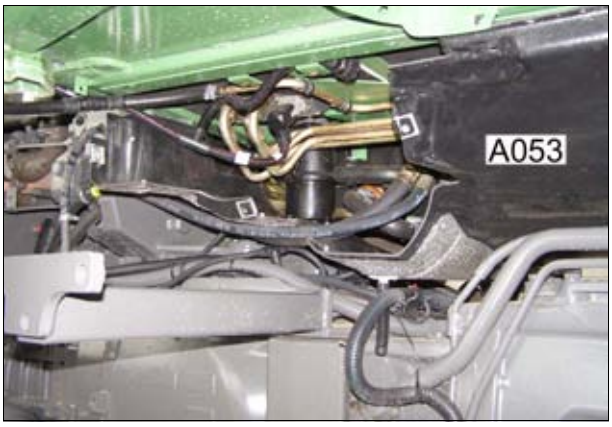


Fig. 11. I001604

A055 - ECU, data transfer

Cab, right mudguard

Detach panel

Fig. 12. I008242

A058 - TopDock (Auto-Guide)

Cab roof compartment

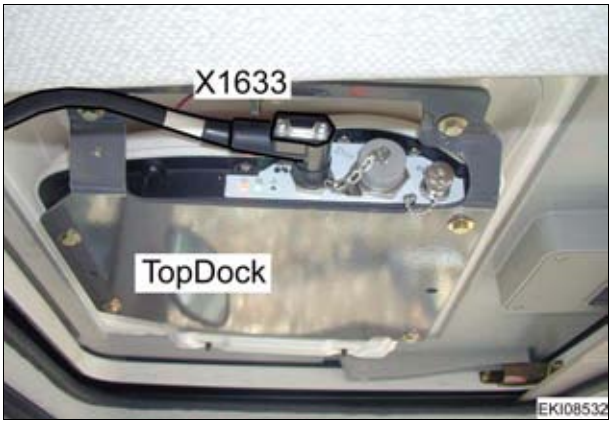


Fig. 13. I002345

A059 - Terminal (Auto-Guide)

In cab, right-hand side

Fig. 14. I001366

A060 - Hands-free device

Cab, right in roof

Fig. 15. I008139

A073 - Terminal (A4)

Cab, on right driver seat

Fig. 16. I008145

A075 - ECU, tail light LED, right
A076 - ECU, tail light LED, left

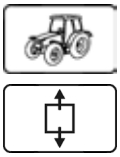


Fig. 17. I000001

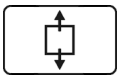
A077 - Immobiliser ECU

NOTE: *Standard from chassis number:*

- 919/../1847
- 922/../2004
- 925/../2054
- 928/../2291
- 931/../
- 933/../

NOTE: *In the event of repair, only the new **A077** - Immobiliser ECU is available.*

In cab, steering column right.



Detach cover

Fig. 18. I009400

A078 - Tachograph ECU

Cab, right in roof
Above **A015** - Radio

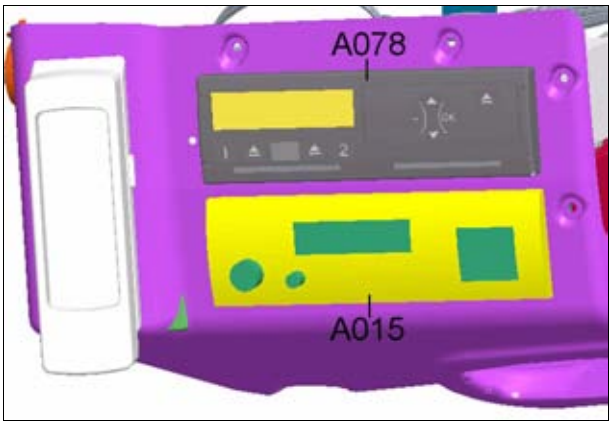
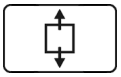


Fig. 19. I008241

2 Electrical/electronic components - B

B002 - Sensor, front PTO speed
X151 - Separation point on B002

Face end of front PTO housing, next to PTO stub shaft

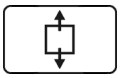


Detach protective funnel

Fig. 20. I001053

B004 - Vacuum switch (air filter)
X153 - Separation point on B004

Right side of engine, on engine air filter

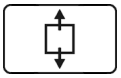


Open bonnet.

Fig. 21. I001055

B008 - Sensor, high-pressure 1
X157 - Separation point on B008

Right side of transmission, on transmission hydraulic system valve block



Detach right rear wheel and panel

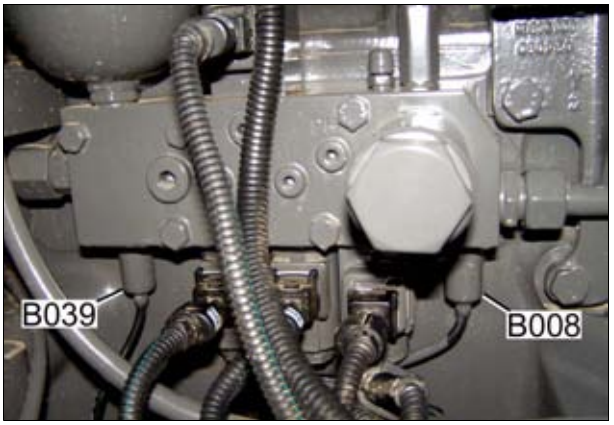
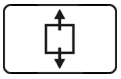


Fig. 22. I001057

B009 - Discharge temperature sensor
X158 - Separation point on B009

Right side of transmission on high-pressure filter



Detach right rear wheel and panel

Fig. 23. I001058

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-

B010 - Sensor, engine speed
X159 - Separation point on B010

Right side of engine, on flywheel

Open bonnet.

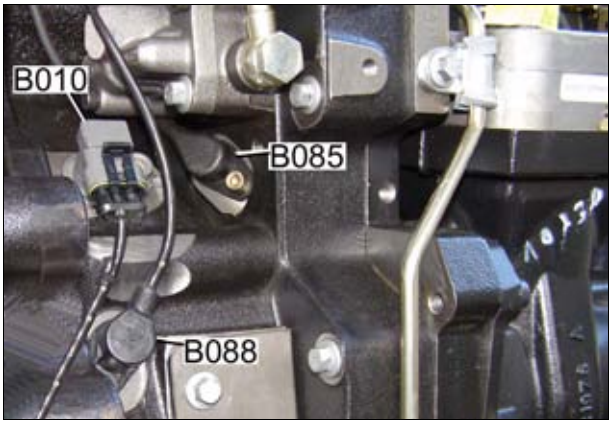


Fig. 24. I001060

B013 - Sensor, hydraulic oil temperature
X162 - Separation point on B013

Right side of engine, on suction line to auxiliary pump

Detach cover panel

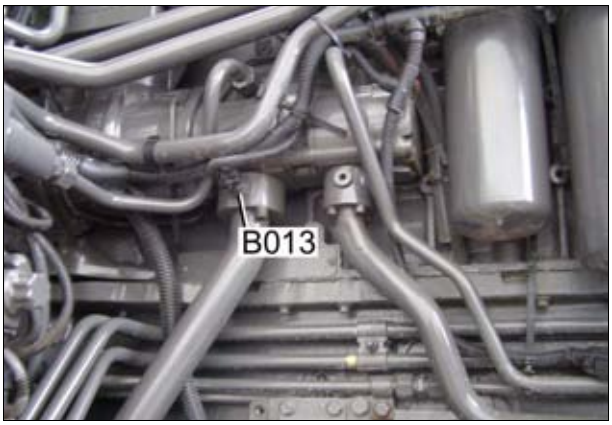


Fig. 25. I001061

B014 - Sensor, collecting shaft
X163 - Separation point on B014

Right side of transmission, below transmission hydraulic system valve block

Detach right rear wheel and panel

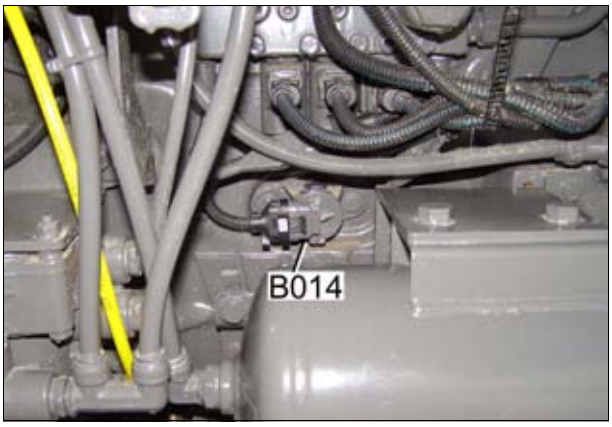


Fig. 26. I001063

B015 - Sensor, bevel pinion
X164 - Separation point on B015

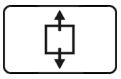
Right side of transmission, next to transmission suction filter

Detach right rear wheel and panel

Fig. 27. I001064

B016 - Sensor, travel range detection
X165 - Separation point on B016

Left side of transmission, behind fuel tank

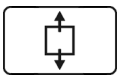


Remove rear left wheel, detach left fuel tank and pull forward

Fig. 28. I001065

B017 - Sensor, clutch pedal
X166 - Separation point on B017

Cab, top left of steering column



Remove left steering column cover

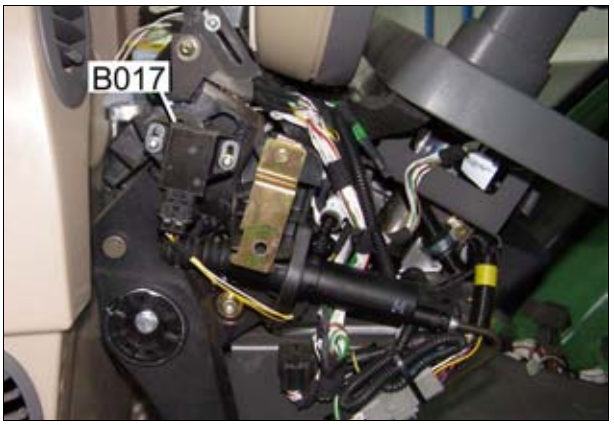
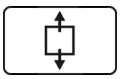


Fig. 29. I001066

B019 - Sensor, compressed air supply
X168 - Separation point on B019

Right rear axle, on front compressed air reservoir.

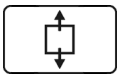


Detach right rear wheel

Fig. 30. I001067

B020 - Sensor, rear PTO speed (stub shaft)
B021 - Sensor, rear PTO speed (clutch)
X169 - Separation point on B020
X170 - Separation point on B021

Rear of trailer, on PTO stub shaft



Detach cover panel

Fig. 31. I001068

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-

B030 - Sensor, rear power lift position
X178 - Separation point on B030

On left lift arm

Detach cover

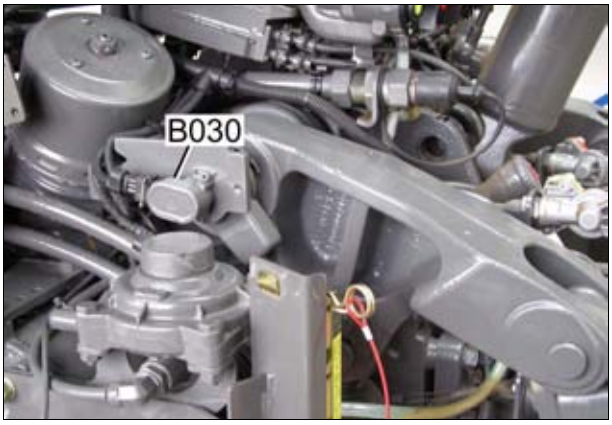


Fig. 32. I001069

B031 - Sensor, draft sensing pin, right
B032 - Sensor, draft sensing pin, left
X179 - Separation point on B031
X180 - Separation point on B032

Lower link bearing (right and left)

Detach cover

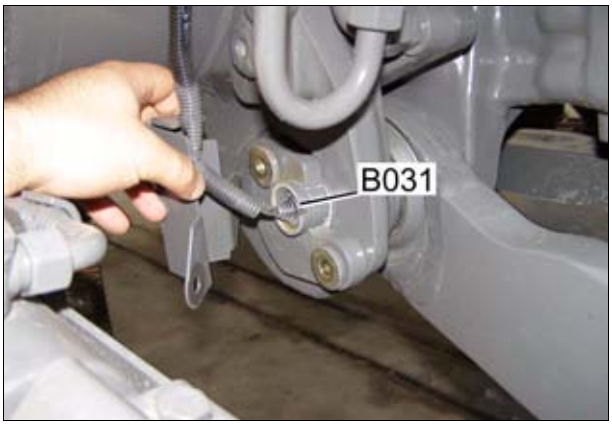


Fig. 33. I001070

B034 - Immersed tube sensor (fuel)
X182 - Separation point on B034

Left fuel tank, top

Detach cover panel

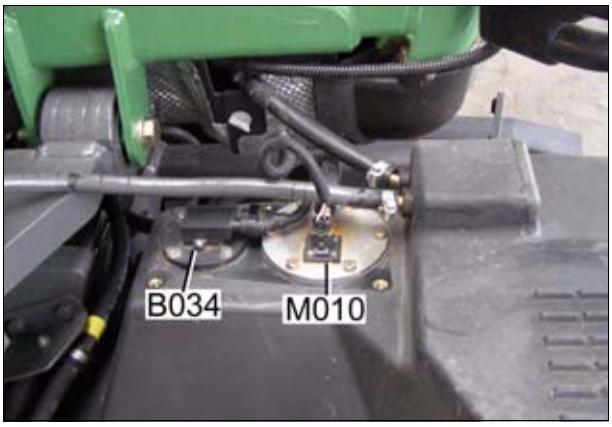


Fig. 34. I001071

B039 - Sensor, high-pressure 2
X177 - Separation point on B039

Right side of transmission, on transmission hydraulic system valve block.

Detach right rear wheel and panel

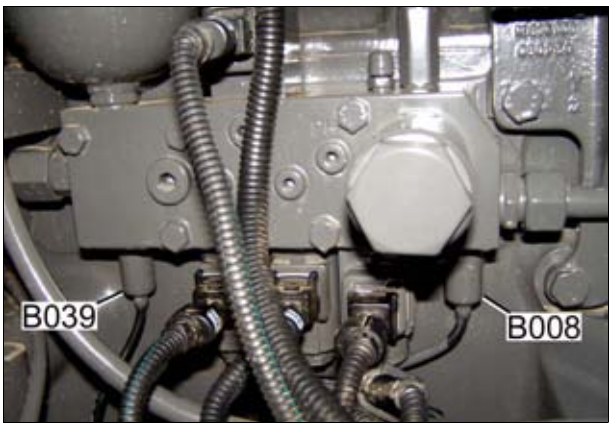
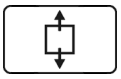


Fig. 35. I001057

B040 - Sensor, front power lift position
X188 - Separation point on B040

Left side of front PTO



Detach cover

Fig. 36. I001072

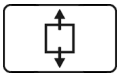
B050 - Loudspeaker, left
B051 - Loudspeaker, right
X289 - Separation point on B051
X311 - Separation point on B050

Cab, in roof lining, front left and right

Fig. 37. I001073

B055 - Sensor, foot throttle
X898 - Separation point on B055

Cab, on left foot throttle

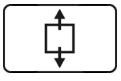


Detach cover

Fig. 38. I001074

B060 - Compressed air supply sensor
X1410 - Separation point on B060

Left rear axle



Detach left rear wheel

Fig. 39. I001075

B061 - Loudspeaker
X1620 - Separation point on B061

Cab, in roof lining, rear right

Fig. 40. I001076

B062 - Loudspeaker
X1622 - Separation point on B062

Cab, in roof lining, rear left

Fig. 41. I001077

B063 - Pressure switch, filter contamination (hydraulic circuit)
X1500 - Separation point on B063

Left side of tractor, clutch housing top, below cab

Fig. 42. I001078

B066 - Sensor, wheel position (left)
X1509 - Separation point on B066

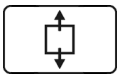
Left front axle on top axle suspension

Detach steering cylinder protective cover, left

Fig. 43. I001080

B067 - Sensor, steering angle
X1508 - Separation point on B067

Front axle, right

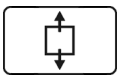


Detach cover

Fig. 44. I001081

B068 - Sensor, wheel position (right)
X1507 - Separation point on B068

Right front axle on top axle suspension, front

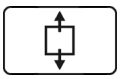


Detach steering cylinder protective cover, right

Fig. 45. I001082

B071 - Sensor, output temperature
X1536 - Separation point on B071

Cab, air box in front of the steering column (photo shows air box removed).



Detach air box and remove its cover

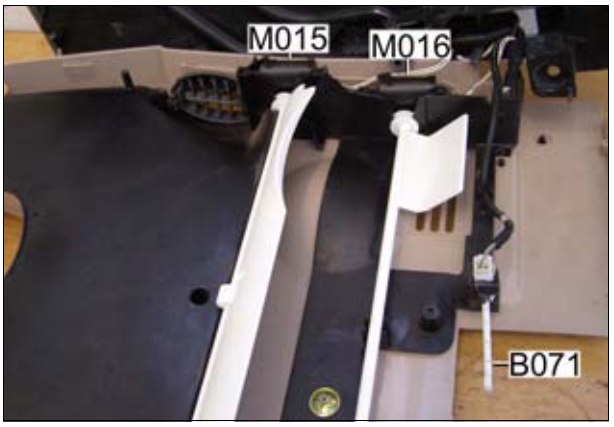


Fig. 46. I001473

B073 - Sensor, solar (irradiation)
X1535 - Separation point on B073

Cab, steering column, at top on wind-screen

Fig. 47. I001083

B074 - Sensor, internal temperature
X1545 - Separation point on B074

Cab, left mudguard in ventilating shaft.

Remove the cab circulation air filter.

Fig. 48. I001258

B076 - Sensor, external temperature
X1538 - Separation point on B076

Air conditioning cooler, reverse side of panel

Open bonnet.

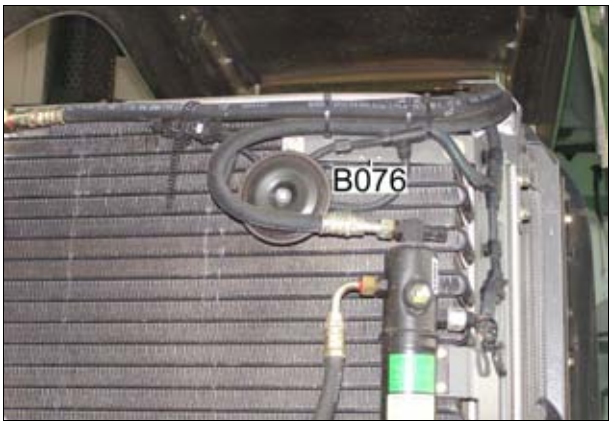


Fig. 49. I001246

B077 - Engine fan (speed sensor/magnetic clutch)
X1532 - Separation point on B077

On fan wheel

Open bonnet.

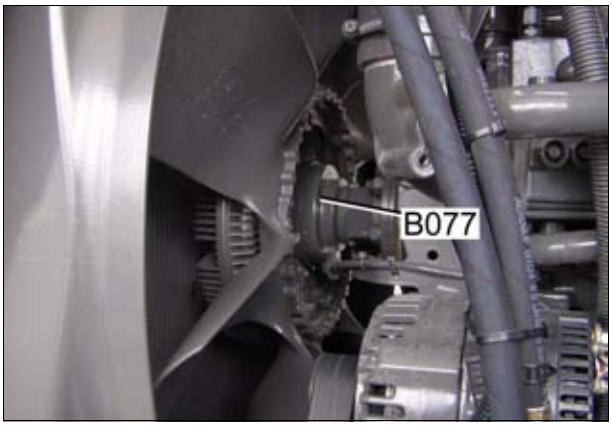


Fig. 50. I001084

B081 - Steering wheel sensor (360°)

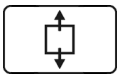
In the intermediate piece on the steering servo unit.

Remove panel on the bottom steering column; remove steering column from the servo unit and push upwards; remove rubber seal from the servo unit

Fig. 51. I006663

B083 - Immobiliser control
X1494 - Separation point on B083

Cab, left side on the steering column.



Remove panel.

Fig. 52. I001999

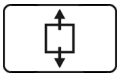
B084 - Sensor, hydraulic oil level
X214 - Separation point on B084

Left side of tractor, clutch housing top, below cab

Fig. 53. I001085

B085 - Camshaft speed sensor
X1654 - Separation point on B085

Right side of engine, on flywheel



Open bonnet.

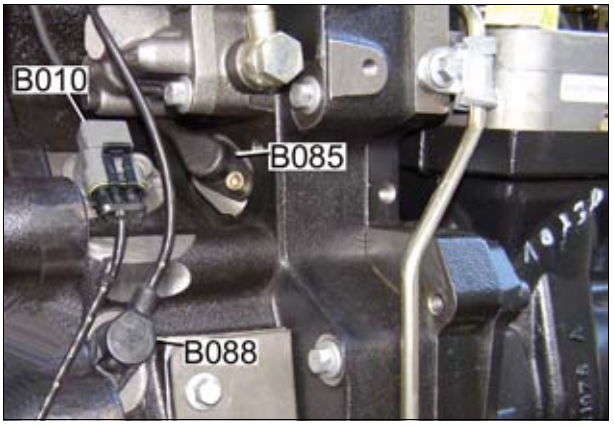
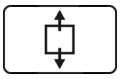


Fig. 54. I001060

B086 - Rail pressure sensor
X1655 - Separation point on B086

Right side of engine, facing fan



Open bonnet.

Fig. 55. I001086

B087 - Fuel low pressure sensor
X1656 - Separation point on B087

Right side of engine, on fuel filter

Open bonnet, detach panel

Fig. 56. I001087

B088 - Crankshaft speed sensor
X1657 - Separation point on B088

Right side of engine, on flywheel

Open bonnet.

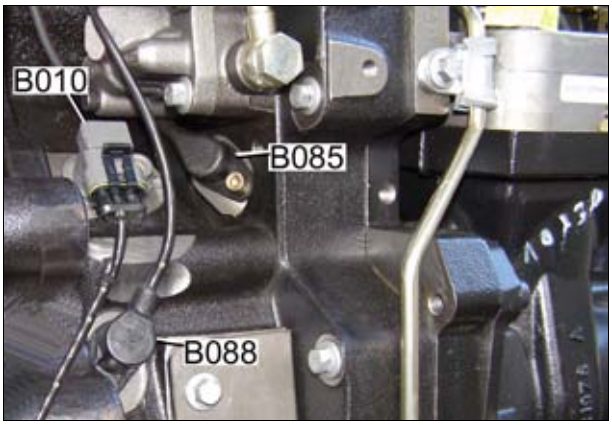


Fig. 57. I001060

B089 - Engine temperature sensor (Deutz)
X1658 - Separation point on B089

On top of engine, on thermostat housing.

Open bonnet.

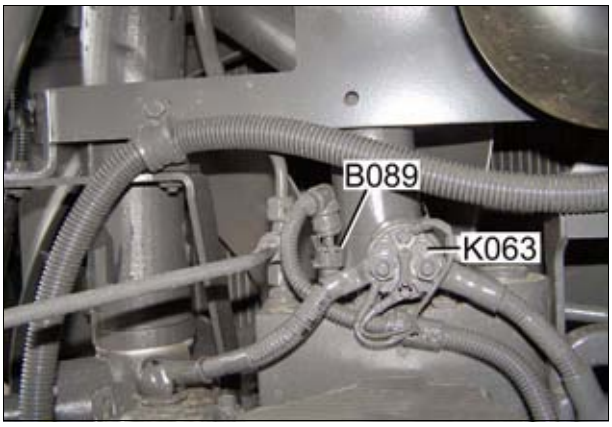


Fig. 58. I001088

B090 - Sensor, oil pressure
X1659 - Separation point on B090 sensor, oil pressure

Right side of engine, on fuel filter

Open bonnet, detach panel

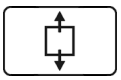
Fig. 59. I001087

Version A

B091 - Sensor, water in fuel
X1660 - Separation point on B091 sensor, water in fuel

NOTE: *Version A is fitted up to chassis numbers: 919/../1011; 922/../1006; 925/../1010; 928/../1013; 931/../1009; 934/../1083*

Right side of tractor, behind the right fuel tank.



Remove the central control block panel.

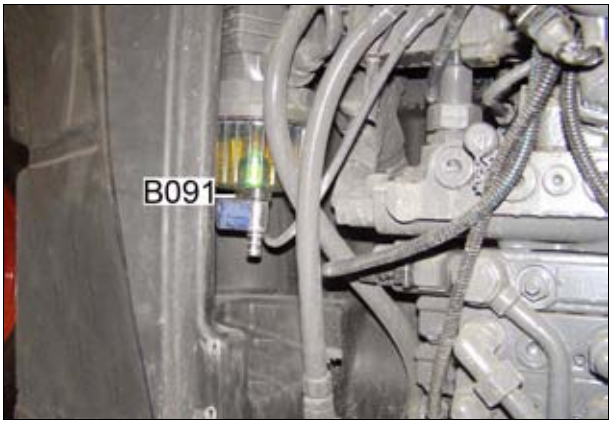


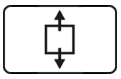
Fig. 60. I002000

Version B

B091 - Sensor, water in fuel
X1660 - Separation point on B091 sensor, water in fuel

NOTE: *Version B is fitted from the following chassis numbers onwards: 919/../1012; 922/../1007; 925/../1011; 928/../1014; 931/../1010; 934/../1084*

Right side of tractor, behind the right fuel tank.

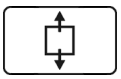


Remove the central control block panel.

Fig. 61. I003821

B092 - Sensor, charge air pressure/temperature
X1661 - Separation point on B092

Engine, top



Open bonnet.

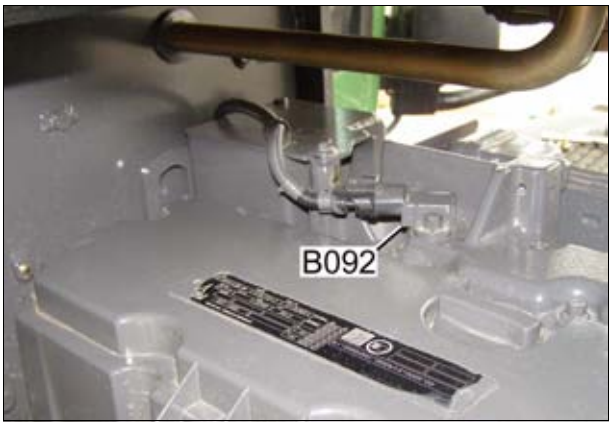


Fig. 62. I001089

B095 - Microphone

Cab, right in roof

Fig. 63. I008139

B101 - KITAS sensor

Rear axle, rear right

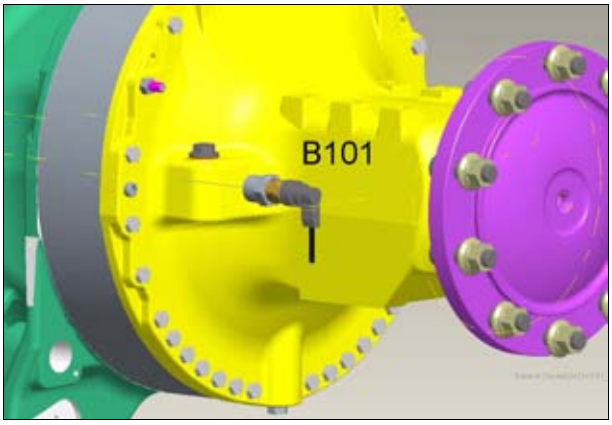


Fig. 64. I008240

3 Electrical/electronic components - E

E003 - H4 additional headlight, right
E004 - H4 additional headlight, left

Fig. 65. I000479

E009 - Licence plate lighting, right
E010 - Licence plate lighting, left

Fig. 66. I000480

E019 - Lighting, cab

Top left in cab roof

Fig. 67. I000481

E020 - Lighting (multifunction armrest)

Top right in cab roof

Fig. 68. I000482

E021 - Rotating beacon, right
E022 - Rotating beacon, left

Fig. 69. I000483

E023 - Rear window heater

Fig. 70. I000484

E050 - Work lights, front left roof, internal
E051 - Work lights, front right roof, internal

Fig. 71. I000485

E054 - Wide vehicle marker lights, right
E055 - Wide vehicle marker lights, left

Fig. 72. I008147

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

Behind right rear axle

Fig. 73. I000486

E064 - Rear direction indicator, left
E065 - Rear direction indicator, right

Fig. 74. I000487

E066 - Brake and tail light left
E067 - Brake and tail light right

Fig. 75. I000488

E070 - Work lights, front right roof, external
E071 - Work lights, front left roof, external

Fig. 76. I000489

E074 - Work light, right (cornerlight)
E075 - Work light, left (cornerlight)

Fig. 77. I000490

E078 - Work light, rear right mudguard (optional Xenon)
E079 - Work light, rear left mudguard (optional Xenon)

Fig. 78. I000491

E082 - Work light, rear right external (roof)
E083 - Work light, rear right internal (roof)
E084 - Work light, rear left internal (roof)
E085 - Work light, rear left external (roof)

Fig. 79. I002036

E086 - Side lamp, front right
E087 - Side lamp, front left
E088 - Direction direction indicator, front right
E089 - Direction direction indicator, front left

Fig. 80. I000490

E098 - Drive headlight (main beam), right
E099 - Drive headlight (dipped beam), right
E100 - Drive headlight (main beam), left
E101 - Drive headlight (dipped beam), left

Fig. 81. I000493

E106 - Exterior mirror (adjustment/heater), right
E107 - Exterior mirror (adjustment/heater), left

Fig. 82. I002037

E108 - Work light, right A pillar (optional Xenon)
E109 - Work light, left A pillar (optional Xenon)

Fig. 83. I000494

E116 - Work lights, Xenon front right roof, external
E117 - Work lights, Xenon front left roof, external

Fig. 84. I002038

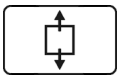
E130 - LED for rear direction indicator, left
E131 - LED for rear direction indicator, right

Fig. 85. I000001

4 Electrical/electronic components - G

G001 - Battery 1
X058 - Battery terminal (+ UB 30)
X059 - Separation point on G001
X060 - Separation point on G001
X066 - Separation point on G001

Right side of tractor, on entrance step

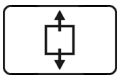


Detach cover

Fig. 86. I001104

G002 - Alternator 1
X062 - Separation point on G002
X064 - Separation point on G002

Right side of engine



Opening the bonnet

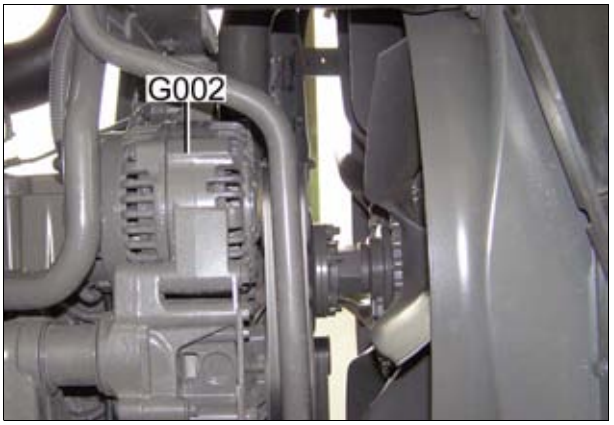
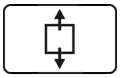


Fig. 87. I001105

G004 - Alternator 2
X449 - Separation point on G004
X450 - Separation point on G004

On left side of engine



Opening the bonnet

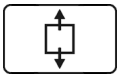
Fig. 88. I001106

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-

5 Electrical/electronic components - H

H005 - Horn
X998 - Separation point on H005
X999 - Separation point on H005

Front of tractor, before radiator assembly



Opening the bonnet

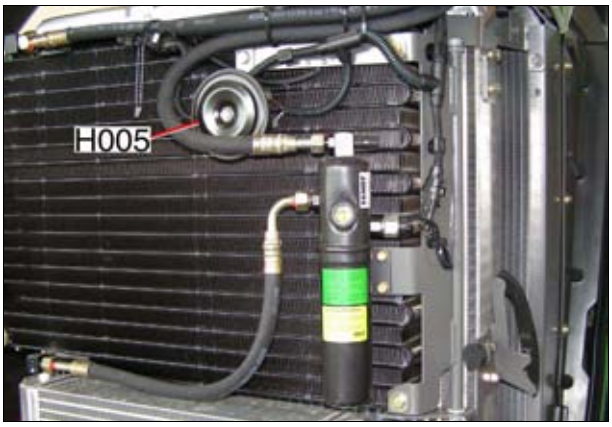
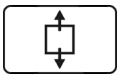


Fig. 89. I001107

H006 - Audio warning signal
X204 - Separation point on H006

Cab, right mudguard, top



Detach cover

Fig. 90. I001108

H009 - Blip signal, reversing
X1544 - Separation point on H007

Left side of tractor, at rear below windscreen washer fluid container

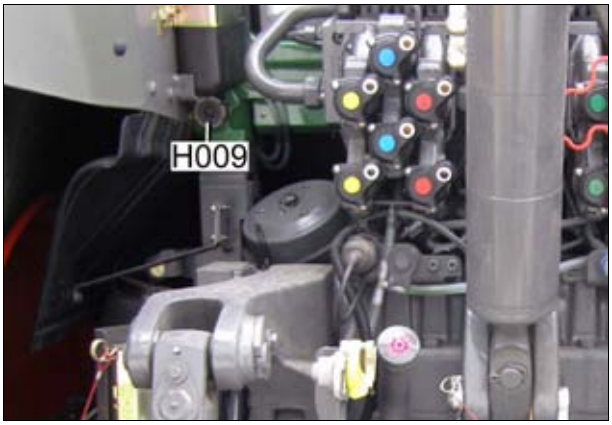
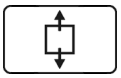


Fig. 91. I001109

6 Electrical/electronic components – K

K061 - ISO bus disconnect relay

Right side of tractor, on the right tank.

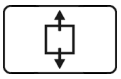


Detach panel

Fig. 92. I001609

K063 - Heater flange relay

Above the engine.



Open bonnet.

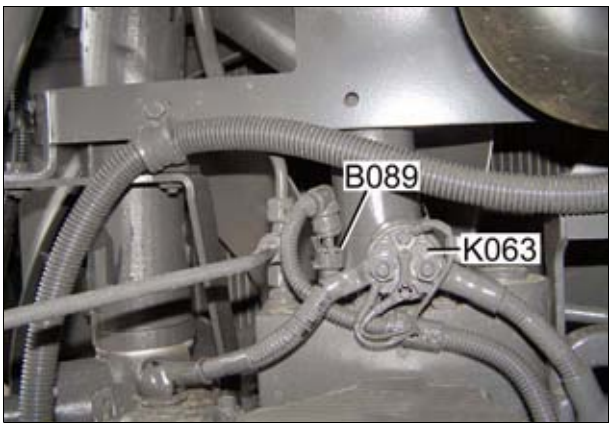
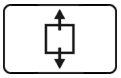


Fig. 93. I001611

K065 - Starter relay
X1648 - Separation point on K065

Left side of engine, on starter



Open bonnet.

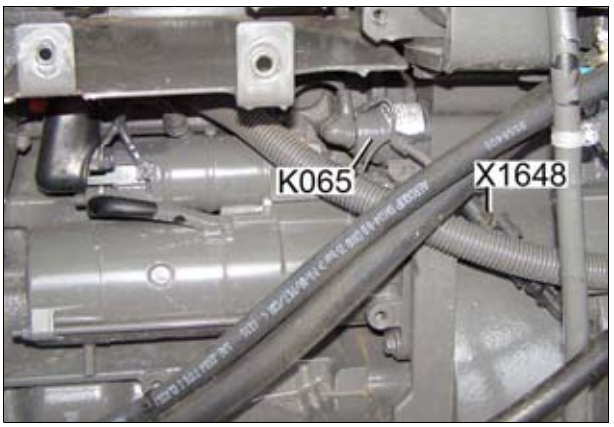
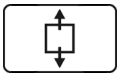


Fig. 94. I002033

K068 - Relay, battery disconnect (impulse)

Right side of tractor, next to the battery.

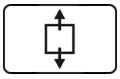


Detach panel

Fig. 95. I003169

K069 - Relay, safety function (battery disconnect)

Cab, right mudguard at bottom



Detach panel

Fig. 96. I003170

7 Electrical/electronic components - M

M001 - starter.
X057 - Separation point on M001
X061 - Separation point on M001

On left side of engine

Open bonnet.

Fig. 97. I001143

M002 - Front wiper motor
X347 - Separation point on M002

Cab, top of steering column

Detach panel

Fig. 98. I001144

M003 - Wiper pump, front
X301 - Separation point on M003

Tractor rear, left mudguard, on washer system reservoir

Remove washer system reservoir

Fig. 99. I001145

M004 - Rear wiper motor
X258 - Separation point on M004

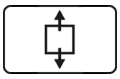
Cab, on upper right of rear window

Detach panel

Fig. 100. I001146

M005 - Wiper pump, rear
X303 - Separation point on M005

Tractor rear, left mudguard, on washer system reservoir



Remove washer system reservoir

Fig. 101. I001147

M010 - Fuel pump
X300 - Separation point on M010

Left-hand fuel tank, top

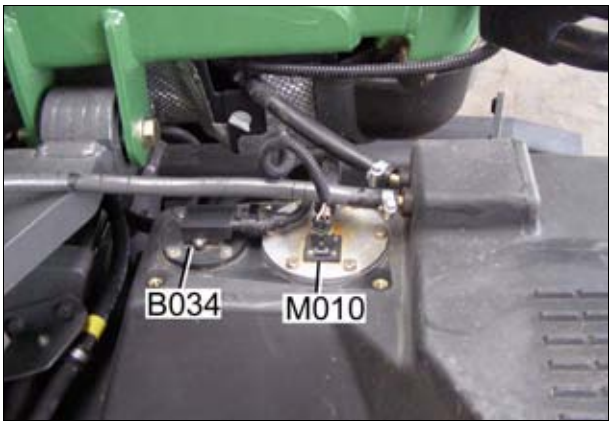
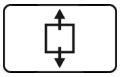


Fig. 102. I001148

M015 - Actuator motor, top/middle air flap
X1546 - Separation point on M015

Cab, air box before steering column



Remove air box and take off cover

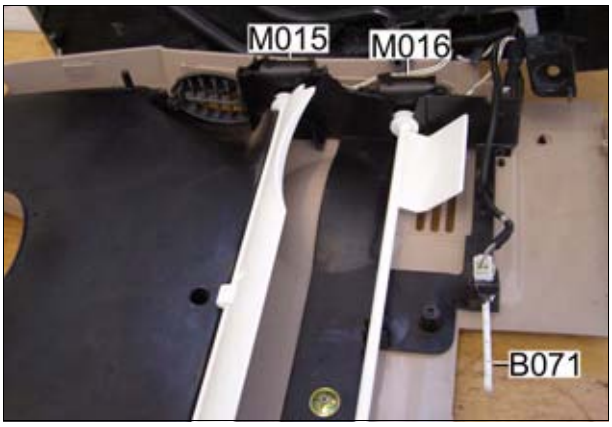
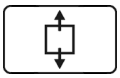


Fig. 103. I001473

M016 - Servomotor, bottom air valve
X1547 - Separation point on M016

Cab, air box before steering column



Remove air box and take off cover

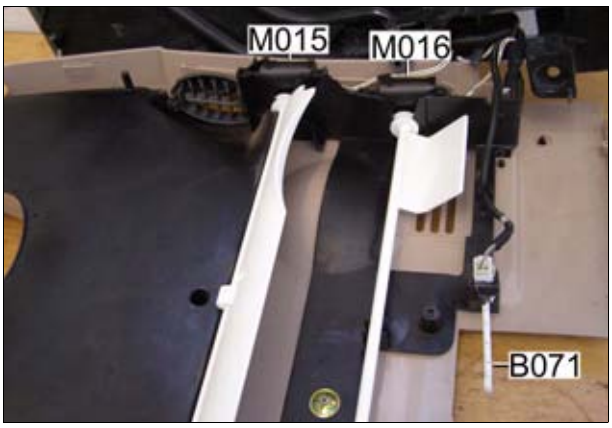
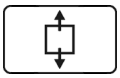


Fig. 104. I001473

M017 - Primary fan
X1555 - Separation point on M017

Left side of tractor, on entrance step under cab



Remove entrance step

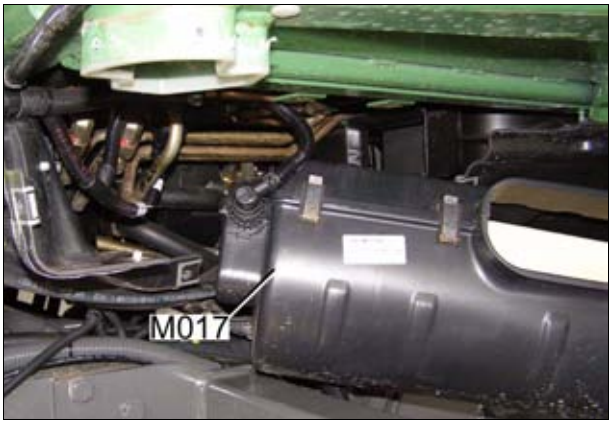


Fig. 105. I001149

8 Electrical/electronic components - S

S002 - Switch, ignition
X072 - Separation point on S002
X246 - Separation point on S002

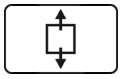
In cab, steering column right.

Fig. 106. I001113

S005 - Switch, right brake
X217 - Separation point on S005

NOTE: ***S005*** *- Switch, right brake only installed in tractors with 1-circuit brake system*

In cab, steering column right.

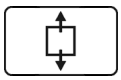


Detach cover

Fig. 107. I009401

S006 - Switch, left brake
X218 - Separation point on S006

In cab, steering column right.



Detach cover

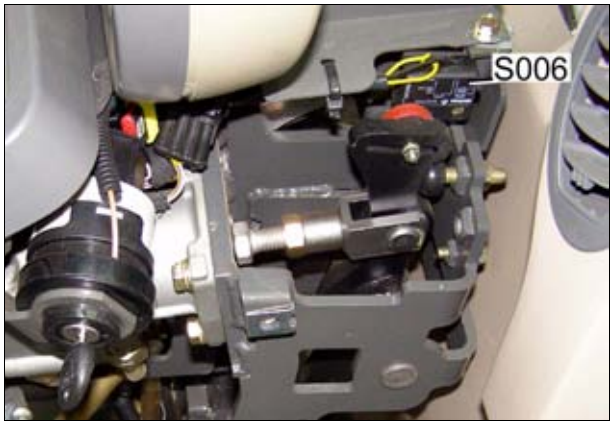
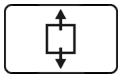


Fig. 108. I001114

S012 - Switch, starter lockout
X082 - Separation point on S012

Cab, steering column left

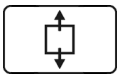


Detach cover

Fig. 109. I001115

S013 - Emergency mode button
X224 - Separation point on S013

Cab, top of right mudguard, next to A013

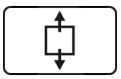


Detach cover

Fig. 110. I001116

S017 - Filter contamination switch
X228 - Separation point on S017

Right side of transmission, on transmission oil filter



Detach right rear wheel and panel

Fig. 111. I001117

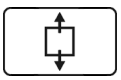
S019 - Button, rear PTO, external left
X229 - Separation point on S019

Rear of tractor, on left mudguard

Fig. 112. I001118

S020 - Button, rear PTO, external right
X230 - Separation point on S020

Rear of tractor, on right mudguard



Detach cover

Fig. 113. I001119

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-

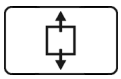
S021 - Button, front power lift, external raise
S022 - Button, front power lift, external lower
X231 - Separation point on S021
X232 - Separation point on S022

Front of tractor, left

Fig. 114. I001123

S025 - Switch, LS pump pressure monitor
X235 - Separation point on S025

Right side of tractor, at top of central control block

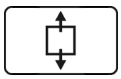


Detach cover

Fig. 115. I001124

S026 - Switch, steering pump flow controller
X236 - Separation point on S026

Right side of tractor, at central valve block



Detach cover

Fig. 116. I001125

S027 - Button, rear power lift, right-hand external raise
S028 - Button, rear power lift, right-hand external lower
X237 - Separation point on S027
X238 - Separation point on S028

Rear of tractor, on right mudguard

Fig. 117. I001126

S029 - Button, rear power lift, left-hand external raise
S030 - Button, rear power lift, left-hand external lower
X239 - Separation point on S029
X240 - Separation point on S030

Rear of tractor, on left mudguard

Fig. 118. I001127

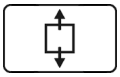
S032 - Switch, left door contact
X299 - Separation point on S032

Cab, left B-pillar

Fig. 119. I001130

S034 - Switch, coolant level
X244 - Separation point on S034

Engine at top, coolant reservoir

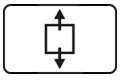


Open bonnet.

Fig. 120. I001131

S035 - Switch, high-pressure/low-pressure (air conditioning system)
X341 - Separation point on S035

Front of tractor, near cooler package



Open bonnet.

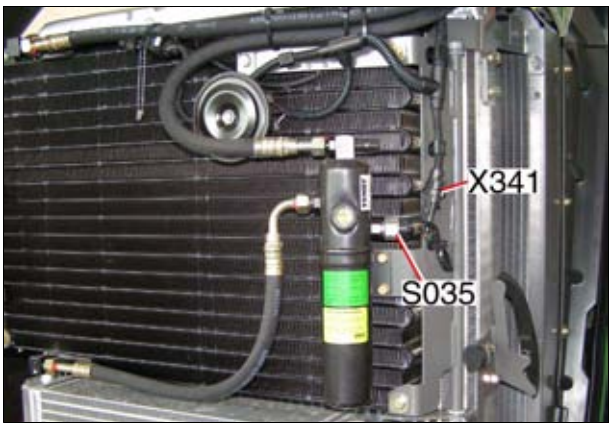


Fig. 121. I001132

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-

S045 - Switch, reversing driver stand
X213 - Separation point on S045

Cab, below rear window

Fig. 122. I003191

S047 - Switch, engine brake
X140 - Separation point on S047

Cab, on floor, left

Fig. 123. I001133

S067 - Button, valve actuation, external raise
S068 - Button, valve actuation, external lower
X1114 - Separation point on S067
X1115 - Separation point on S068

Rear of tractor, on left mudguard

Fig. 124. I001134

S075 - Switch, guard rail pump flow monitor
X1499 - Separation point on S075

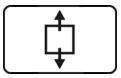
Right side of tractor, at central valve block

Detach cover

Fig. 125. I001135

S076 - Switch, clutch fluid
X1542 - Separation point on S076
X1543 - Separation point on S076

Cab, top of steering column



Detach cover

Fig. 126. I001136

S079 - Switch, steering column
X1590 - Separation point on S079
X1591 - Separation point on S079

Cab, steering column left

Fig. 127. I001137

S080 - Switch, hand brake
X1467 - Separation point on S080

Rear axle right, Tristop cylinder

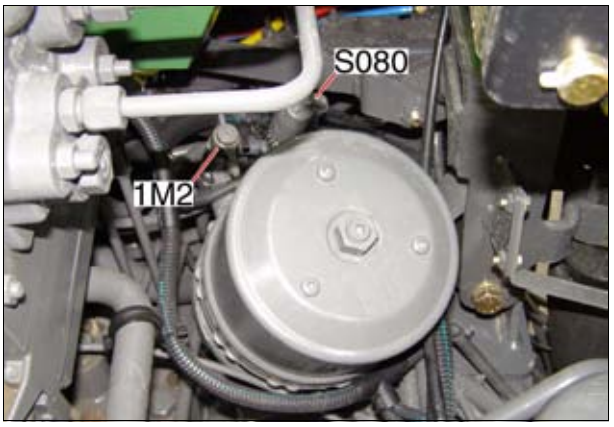


Fig. 128. I001138

S085 - Switch, reverse operation (RÜFA) actuation
X1650 - Separation point on S085

Cab, below steering column at right-hand side

Fig. 129. I003269

S086 - Switch, brake wearing, right
S087 - Switch, brake wearing, left
X1651 - Separation point on S086
X1652 - Separation point on S087

Rear axle left and right, on Tristop cylinder

Fig. 130. I001140

S092 - Battery disconnect switch
X993 - Separation point on S082

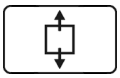
Cab, top of right mudguard

Fig. 131. I001139

9 Electrical/electronic components – U

U001 - Immobiliser aerial

Cab, steering column at the ignition switch.



Remove panel.

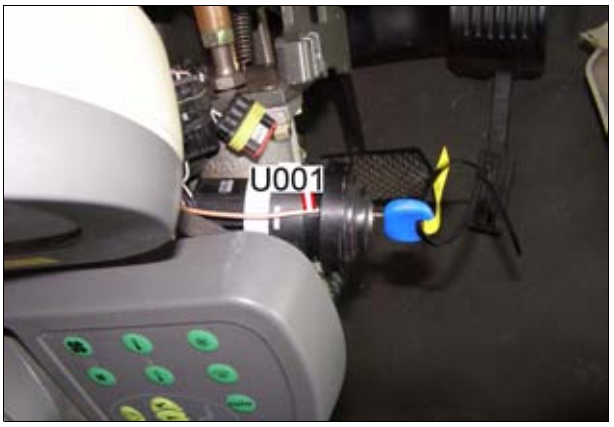
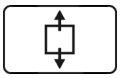


Fig. 132. I002006

U002 - Radio aerial

Cab, in cab roof.



Remove the roof lining.

Fig. 133. I002493

10 Electrical/electronic components - X

X007 - Implement socket
X008 - Socket, on-board computer counter input

Cab, C-pillar, top right

Fig. 134. I001191

X015 - External control socket

Rear of tractor, right

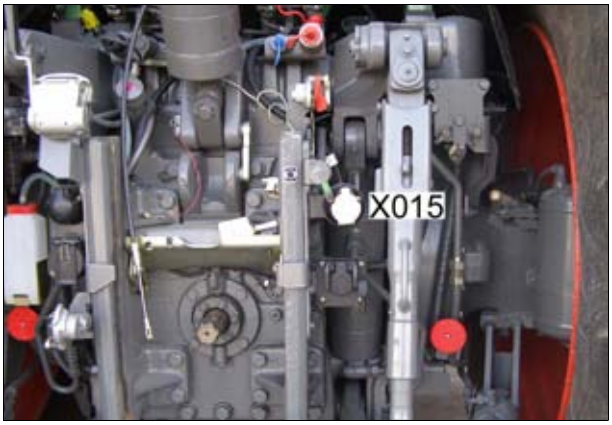


Fig. 135. I001300

X017 - Front socket

Front of tractor, left

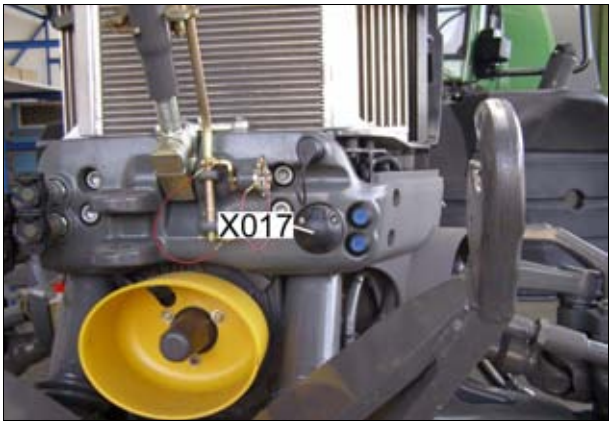


Fig. 136. I001217

X018 - Rear socket

Rear of tractor, left

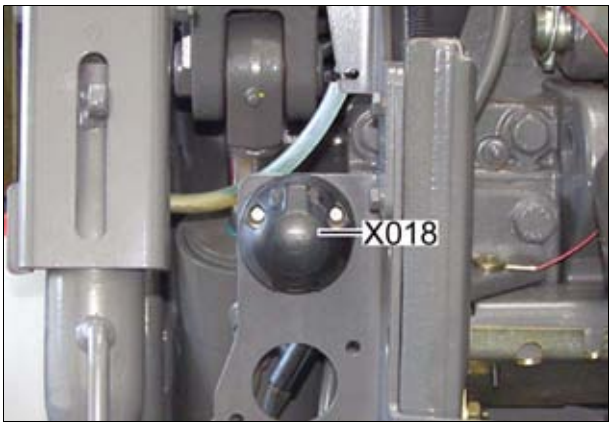


Fig. 137. I001192

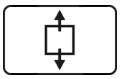
X028 - ISO socket (cab)

Cab, C-pillar, top right

Fig. 138. I001191

X037 - Separation point on A009

Right side of transmission.

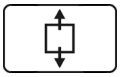


Detach right rear wheel and panel

Fig. 139. I001227

X100 [blau] - Separation point on A007
X101 [gelb] - Separation point on A007

Rear of instrument panel



Swivel instrument panel forwards

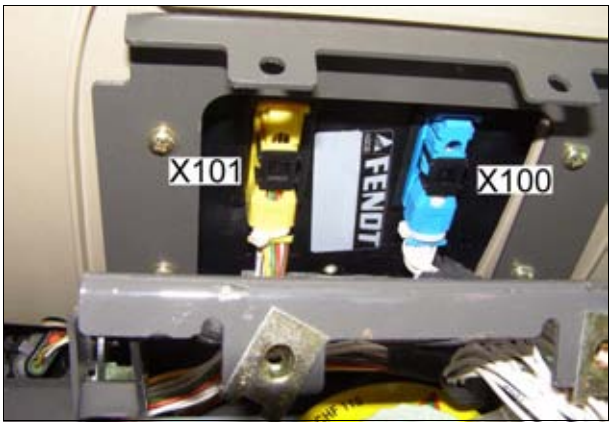
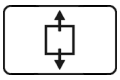


Fig. 140. I001226

X200 - Separation point on A013
X201 - Separation point on A013
X202 - Separation point on A013

Cab, right mudguard, top



Detach cover

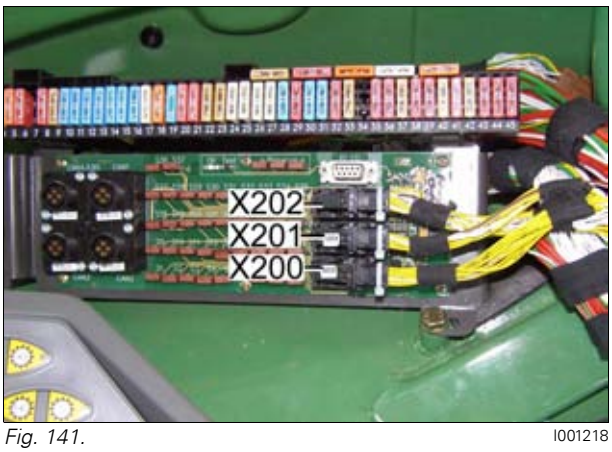


Fig. 141. I001218

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-

X254 - 10 amp socket
X255 - 25 A socket (+ UB 30)
X256 - 25 amp socket (earth)

Cab, C-pillar, top right

Fig. 142. I001191

X259 - Separation point on E023
X260 - Separation point on E023

Cab, rear wiper motor

Detach cover

Fig. 143. I001230

X342 - Separation point on Y024

Left side of engine, on air conditioning compressor

Open bonnet.

Fig. 144. I001193

X345 - Separation point on E022

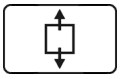
Cab roof, right

Detach cover

Fig. 145. I001228

X346 - Separation point on E021

Cab roof, left



Detach cover

Fig. 146. I001229

X400 - Rear ISO implement socket

Rear of tractor, right

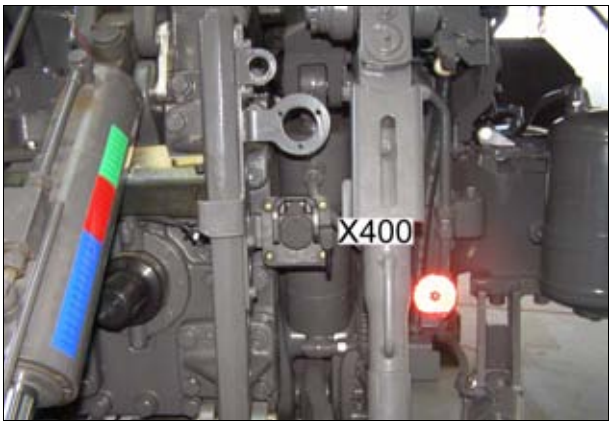
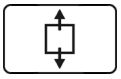


Fig. 147. I001279

X454 - Separation point on A038
X455 - Separation point on A038
X456 - Separation point on A038

Cab, right mudguard, bottom



Detach cover

Fig. 148. I001231

X479 - Separation point on A011

Left lower side of tractor, between left fuel tank and clutch housing

Fig. 149. I003187

X497 - Separation point, ISO preparation

Right side of tractor, next to fuel tank, right

Detach cover

Fig. 150. I001268

X510 - Earth pin, engine left
X511 - Earth pin, engine
X512 - Earth pin, engine
X513 - Earth pin, engine
X520 - Earth pin, oil sump right
X521 - Earth pin, engine

Right side of engine

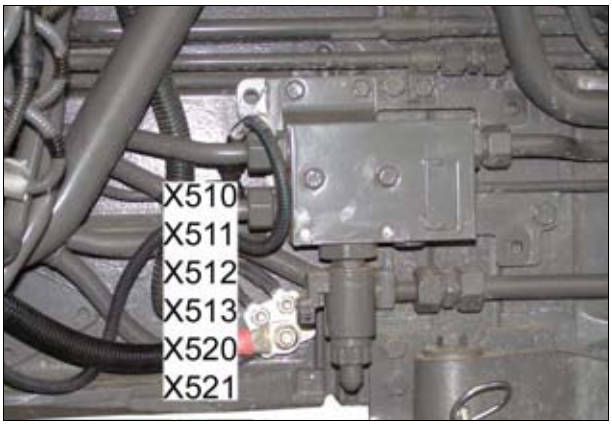


Fig. 151. I001233

X532 - Earth pin, cab body
X533 - Earth pin, cab body
X534 - Earth pin, cab body

Right C-pillar, top

Detach cover plate with connectors

Fig. 152. I001261

X550 - Earth pin, operator platform right

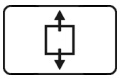
Cab, right mudguard, bottom

Detach panel

Fig. 153. I001247

X551 - Earth pin, operator platform right
X552 - Earth pin, operator platform
X553 - Earth pin, operator platform
X554 - Earth pin, operator platform

Cab, right mudguard, bottom



Detach panel

Fig. 154. I001248

X558 - Earth pin, transmission
X559 - Earth pin, transmission
X570 - Earth pin, transmission
X571 - Earth pin, transmission
X572 - Earth pin, transmission
X573 - Earth pin, transmission
X574 - Earth pin, transmission

Right side of transmission, next to rear axle housing

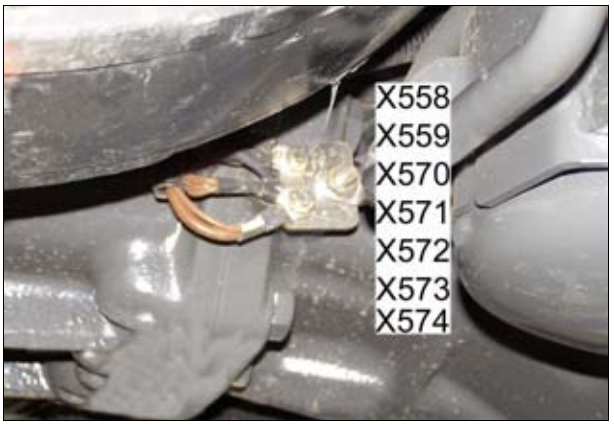


Fig. 155. I001299

X596 - Connector, earth (X1048 socket, ABS)

Tractor rear, back of ABS socket.

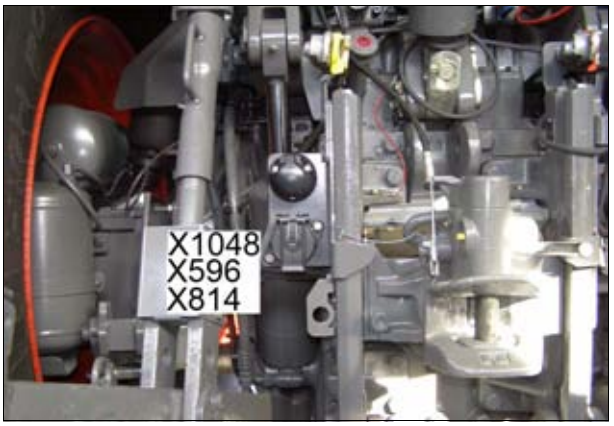
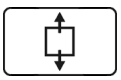


Fig. 156. I001842

X598 - Connector, K bus_High
X599 - Connector, K bus_Low

Cab, right mudguard, bottom

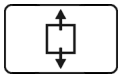


Detach panel

Fig. 157. I001251

X608 - Connector, + UB 15

Cab, right mudguard, bottom

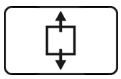


Detach panel

Fig. 158. I001195

X619 - Connector, electronics earth
X620 - Connector, sensor system earth

Cab, right mudguard, top



Detach panel

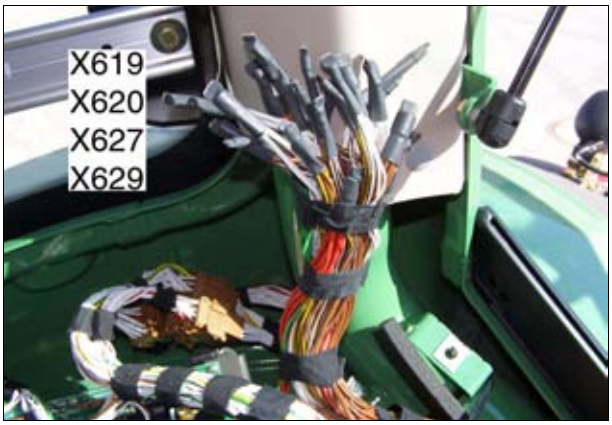
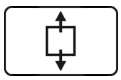


Fig. 159. I001196

X621 - Connector, sensor system earth

Cab, right mudguard, top



Detach panel

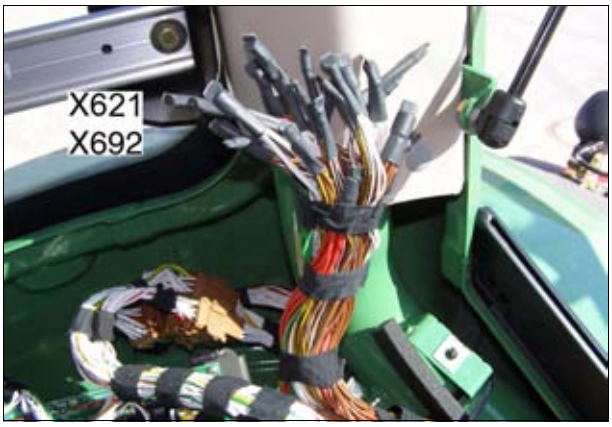
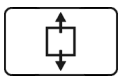


Fig. 160. I001275

X627 - Connector, electronics earth
X629 - Connector, + UB 30

Cab, right mudguard, top



Detach panel

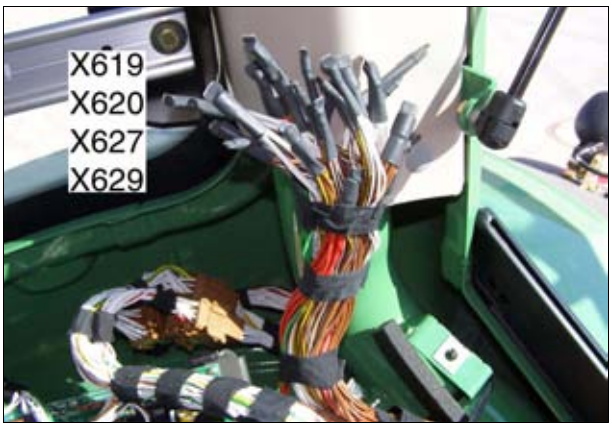
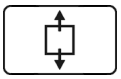


Fig. 161. I001196

X631 - Connector, rear PTO LED ON
X635 - Connector, sensor system earth (instrument panel)
X643 - Connector, instrument panel earth

Cab, right mudguard, top

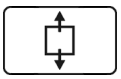


Detach panel

Fig. 162. I001197

X650 - Connector, headlight 56b (dipped beam)
X651 - Connector, headlight 56a (main beam)

Cab, right mudguard, top

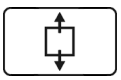


Detach panel

Fig. 163. I001198

X657 - Connector, auxiliary lighting 56a (main beam)
X658 - Connector, auxiliary lighting 56b (dipped beam)
X659 - Connector, work light (cornerlight)
X660 - Connector, sensor system earth
X661 - Connector, electronics earth

Cab, right mudguard, top

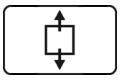


Detach panel

Fig. 164. I001199

X668 - Connector, sensor system earth
X669 - Connector, sensor system earth
X671 - Connector, sensor system earth

Right side of tractor, next to fuel tank, right



Detach panel and right rear wheel, protective guard and cap

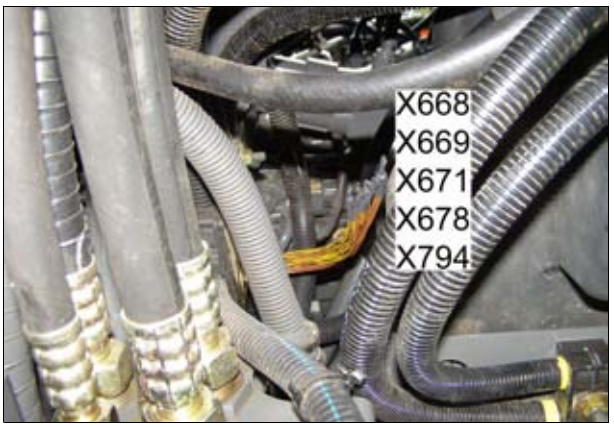
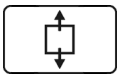


Fig. 165. I001277

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-

X672 - Connector, sensor system earth
X673 - Connector, sensor system earth
X674 - Connector, sensor system earth

Right side of tractor, next to transmission oil filter



Detach protective guard and cap

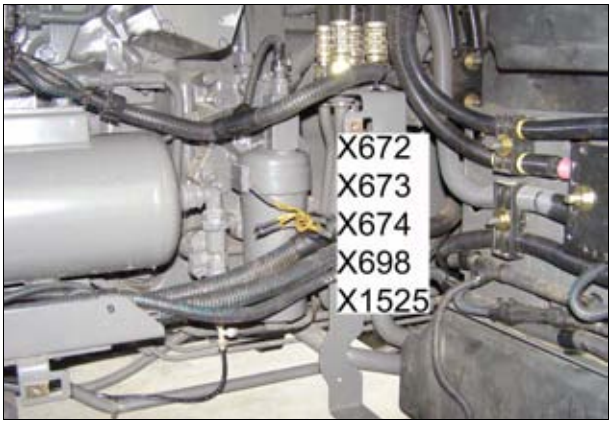
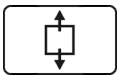


Fig. 166. I001276

X678 - Connector, sensor system earth

Right side of tractor, next to fuel tank, right



Detach panel and right rear wheel, protective guard and cap

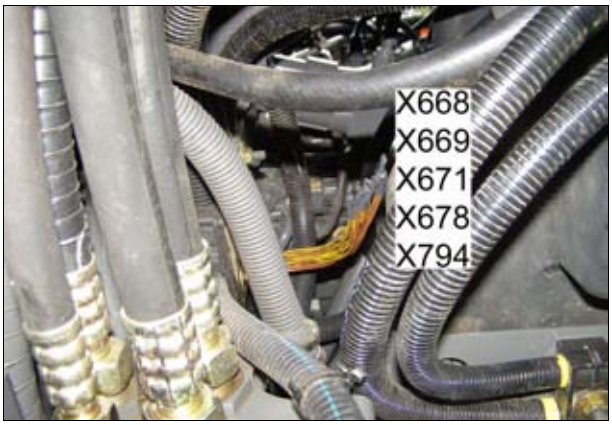


Fig. 167. I001277

X684 - Connector, ISO socket earth

Rear of tractor, right

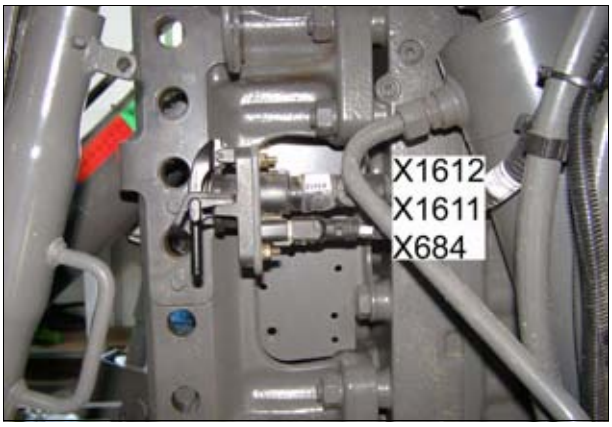
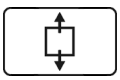


Fig. 168. I001280

X692 - Connector, +UB 30 (A051)

Cab, right mudguard, top



Detach panel

Fig. 169. I001200

X694 - Connector, +UB 30 (A038)

Cab, right mudguard, bottom

Detach panel

Fig. 170. I001195

X698 - Connector, sensor system earth

Right side of tractor, next to transmission oil filter

Detach protective guard and cap

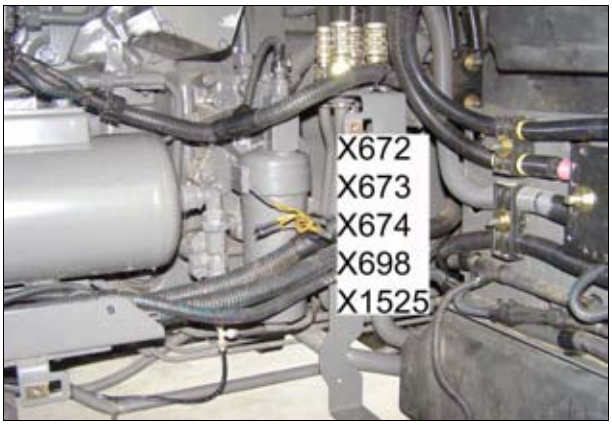


Fig. 171. I001276

X707 - Connector, ISO bus_Low
X708 - Connector, ISO bus_High
X711 - Connector, V bus_High
X712 - Connector, V bus_Low

Cab, right side on floor

Detach panel and floor mat

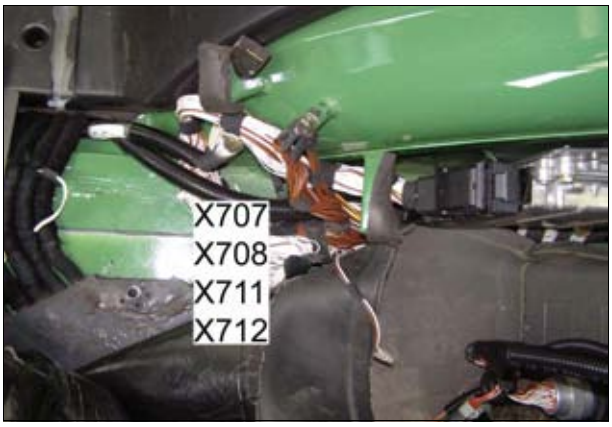


Fig. 172. I001249

X714 - Connector, G bus_Low
X715 - Connector, G bus_High
X718 - Connector, K bus_Low
X719 - Connector, K bus_High

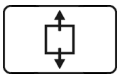
Cab, right side on floor

Detach panel and floor mat

Fig. 173. I001250

X725 - Connector, K bus_High
X726 - Connector, K bus_Low

Cab, right mudguard, top

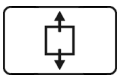


Detach panel

Fig. 174. I001205

X727 - Connector, ISO bus_High
X728 - Connector, ISO bus_Low

Cab, right mudguard, top

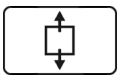


Detach panel

Fig. 175. I001206

X738 - Connector, serial RXD
X739 - Connector, serial TXD

Cab, right mudguard, top



Detach panel

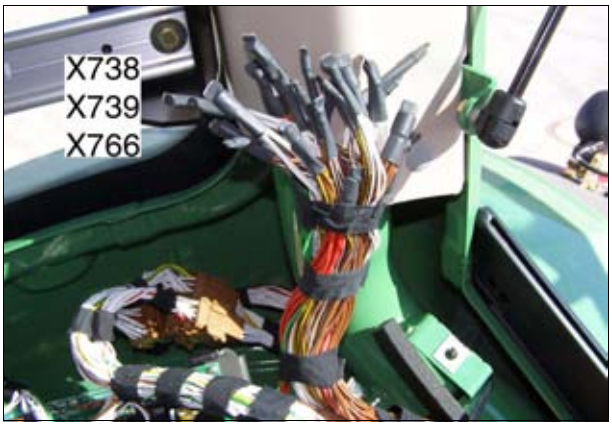
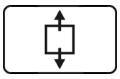


Fig. 176. I001202

X756 - Connector, K bus_High
X757 - Connector, K bus_Low
X758 - Connector, ISO bus_High
X759 - Connector, ISO bus_Low

Cab, right mudguard, top

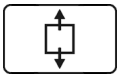


Detach panel

Fig. 177. I001281

X760 - Connector, earth

Rear mudguard, left

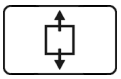


Detach cover panel

Fig. 178. I001270

X761 - Connector, earth

Rear mudguard, right

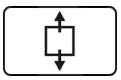


Detach cover panel

Fig. 179. I001269

X762 - Connector, + UB 15

Cab, left side of steering column



Detach panel

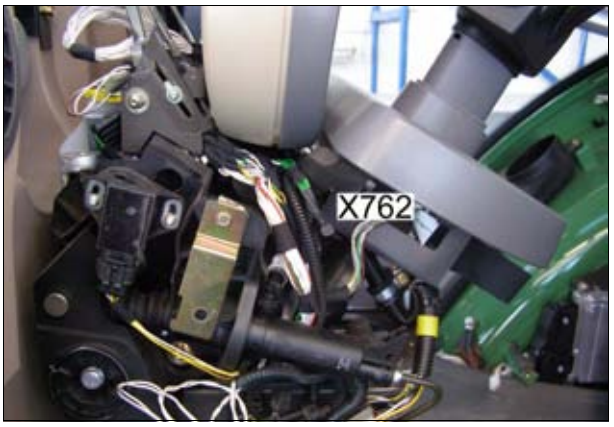
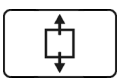


Fig. 180. I001272

X766 - Connector, air conditioning earth

Cab, right mudguard, top



Detach panel

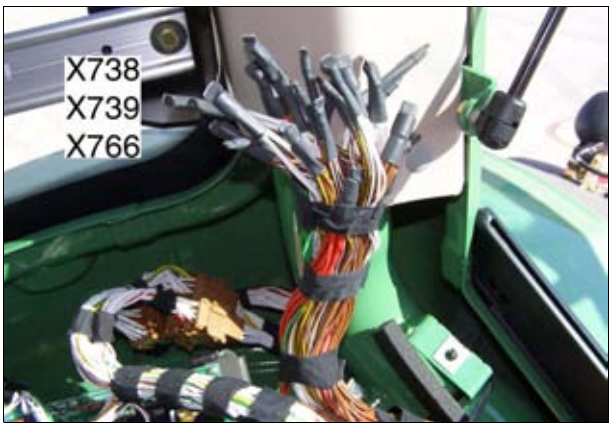
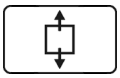


Fig. 181. I001202

X769 - Connector, signal (E021/E022)
X789 - Connector, signal (E083/E084)
X793 - Connector, signal (E082/E085)

Right C-pillar, top

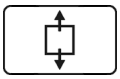


Detach cover plate with connectors

Fig. 182. I001262

X794 - Connector, earth (A051)

Right side of tractor, next to fuel tank, right



Detach right rear wheel and panel, protective guard and cap

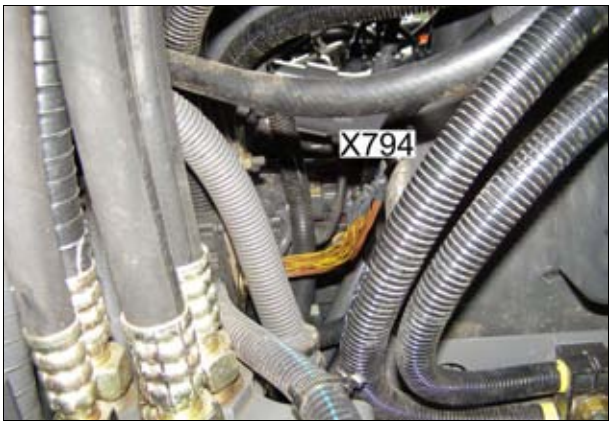
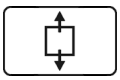


Fig. 183. I001287

X796 - Cable coupling (M002)

Cab, steering column, left side on floor

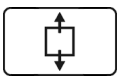


Lift floor mat

Fig. 184. I001245

X797 - Connector, air conditioning coupler signal

Front of tractor, on radiator

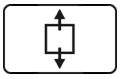


Open bonnet.

Fig. 185. I001288

X810 - EDC diagnostics socket (engine control unit)

Cab, right mudguard, top



Detach cover

Fig. 186. I001207

X814 - Connector, +UB30 (X1048 socket, ABS)

Tractor rear, back of ABS socket.

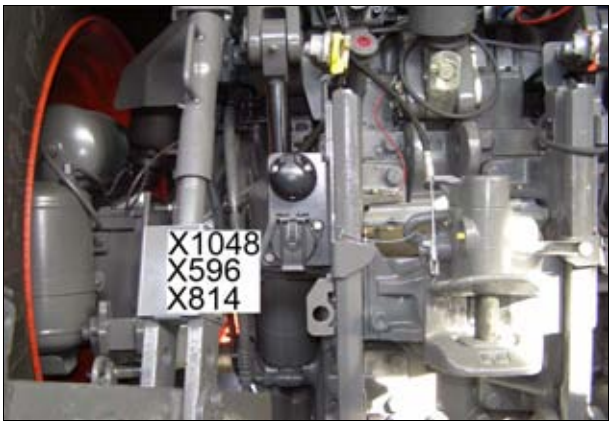
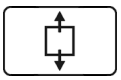


Fig. 187. I001842

X834 - Separation point on E070

Cab roof right, underneath roof lining



Remove roof lining.

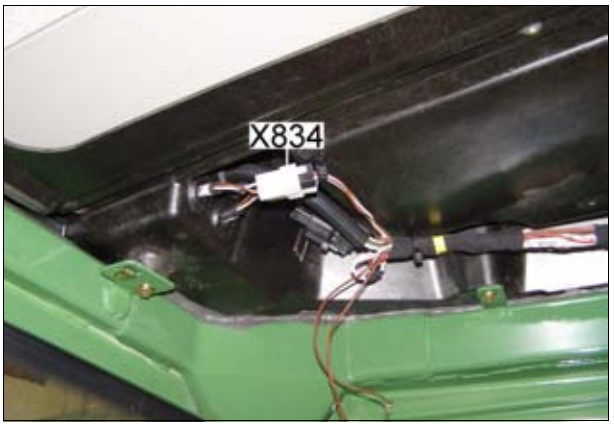
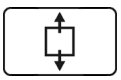


Fig. 188. I009308

X835 - Separation point on E071

Cab roof left, underneath roof lining



Remove roof lining.

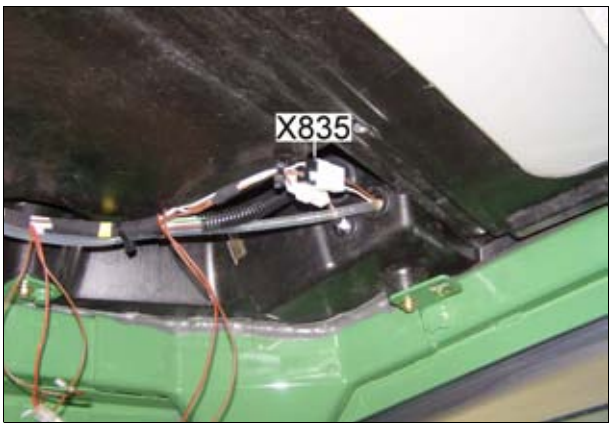


Fig. 189. I009309

X836 - Separation point on E0116 / E117

Fig. 190. I000001

X837 - Separation point on X1048 socket, ABS

Top of rear axle housing, back of valve block.

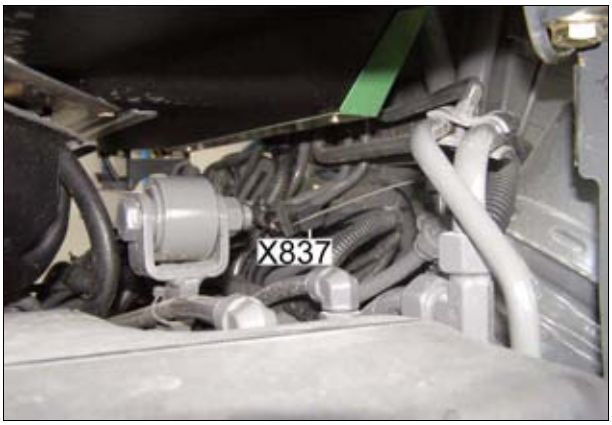


Fig. 191. I001289

X838 - Separation point on X015 socket, external control

Top of rear axle housing, back of valve block.

Fig. 192. I001844

X845 - 25 A socket (+ UB 30)
X846 - 25 amp socket (earth)
X847 - 25 A socket (+ UB 30)
X848 - 25 amp socket (earth)

Cab, C-pillar, top right

Fig. 193. I001191

X868 - Separation point on E106

Mirror holder, right

Detach cover

Fig. 194. I001253

X869 - Separation point on E107

Mirror holder, left

Detach cover

Fig. 195. I001254

X896 - Separation point on E054

Cab, left mudguard, bottom

Detach panel

Fig. 196. I001256

X897 - Separation point on E055

Cab, right mudguard, top

Detach panel

Fig. 197. I001223

X899 - Connector, earth

Engine, next to engine control unit

Open bonnet.

Fig. 198. I001273

X916 - Separation point on E064
X916 - Separation point on E118
X917 - Separation point on E065
X917 - Separation point on E119

Fig. 199. I000001

X920 - Separation point on A053
X921 - Separation point on A053

Cab floor, to right of throttle pedal.

Detach panel

Fig. 200. I001843

X1048 - Socket ABS

Rear of tractor, left

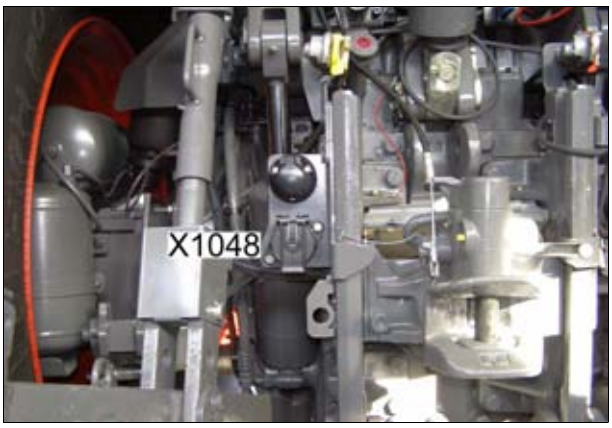
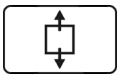


Fig. 201. I001301

X1315 - Separation point on radio (compact plug)
X1316 - Separation point on radio (compact plug)

Cab, in roof lining, top right

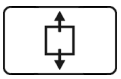


Detach cover or radio

Fig. 202. I001282

X1343 - Connector, G bus_High
X1344 - Connector, G bus_Low

Cab, left side of steering column



Detach panel

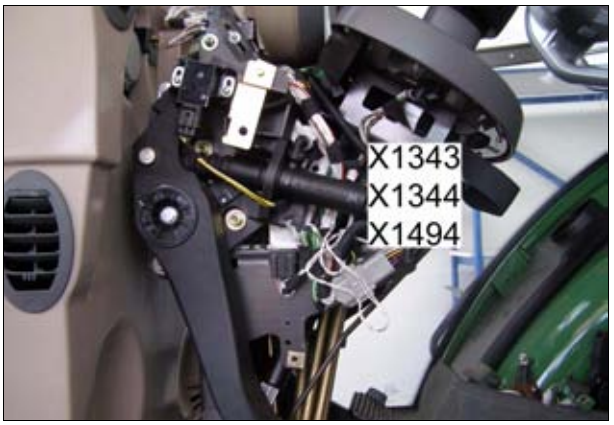


Fig. 203. I001274

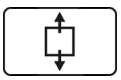
X1401 - Separation point on A039

Cab, driver seat, bottom right

Fig. 204. I001225

X1402 [B] - Separation point on A050
X1403 [A] - Separation point on A050

Cab, right mudguard, bottom



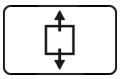
Detach panel

Fig. 205. I001224

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-

X1404 [A] - Separation point on A038
X1405 [B] - Separation point on A038
X1406 [C] - Separation point on A038
X1407 [D] - Separation point on A038
X1408 [E] - Separation point on A038
X1409 [F] - Separation point on A038

Cab, right mudguard, bottom



Detach panel

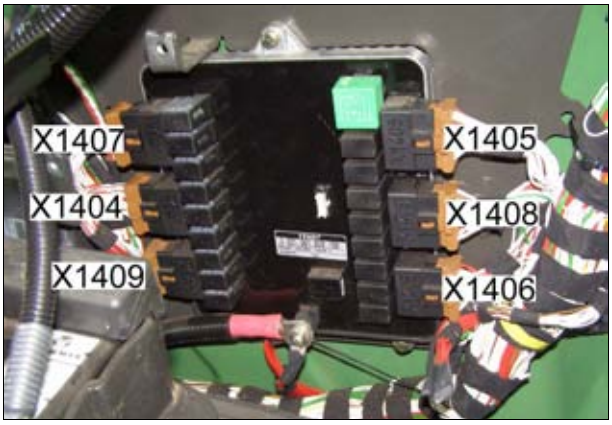
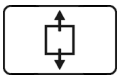


Fig. 206. I001219

X1417 - Cable coupling, operator platform/cab

Cab, right mudguard, top



Detach panel

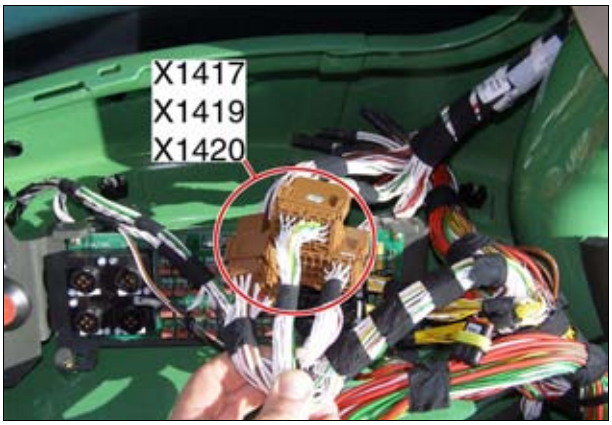


Fig. 207. I001203

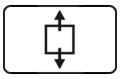
X1418 - Cable coupling, operator platform/transmission

Right entrance step

Fig. 208. I001236

X1419 - Cab cable coupling
X1420 - Cab cable coupling

Cab, right mudguard, top



Detach panel

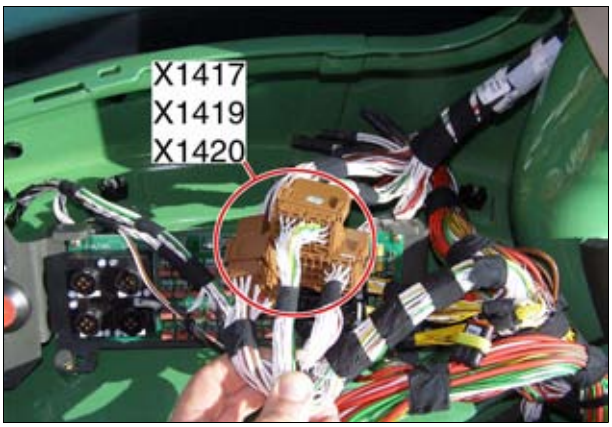


Fig. 209. I001203

X1421 - Cable coupling, operator platform

Cab, right mudguard, bottom rear

Detach panel

Fig. 210. I001255

X1422 - Cable coupling, mudguard

Cab, left mudguard, bottom rear

Detach panel

Fig. 211. I001257

X1423 - Cable coupling, operator platform/transmission
X1424 - Cable coupling, operator platform
X1425 - Cable coupling, operator platform

Right entrance step

Fig. 212. I001237

X1436 - Cable coupling, tractor bonnet (drive light, cornerlight)

Right side of engine, next to engine control unit

Open bonnet.

Fig. 213. I001260

X1440 - Fuse holder

Cab, right mudguard, top

Detach cover

Fig. 214. I001208

X1461 - Connector, sensor system earth (left mudguard)

Rear mudguard, right

Detach cover panel

Fig. 215. I001269

X1462 - Connector, sensor system earth (right mudguard)

Rear mudguard, left

Detach cover panel

Fig. 216. I001270

X1463 - Connector, G bus_High
X1464 - Connector, G bus_Low

Right side of tractor, next to fuel tank, right

Detach right rear wheel and panel

Fig. 217. I001290

X1466 - Separation point on A051

Engine control unit

Open bonnet.

Fig. 218. I001259

X1525 - Connector, sensor + UB (from instrument panel)

Right side of tractor, next to transmission oil filter

Detach protective guard and cap

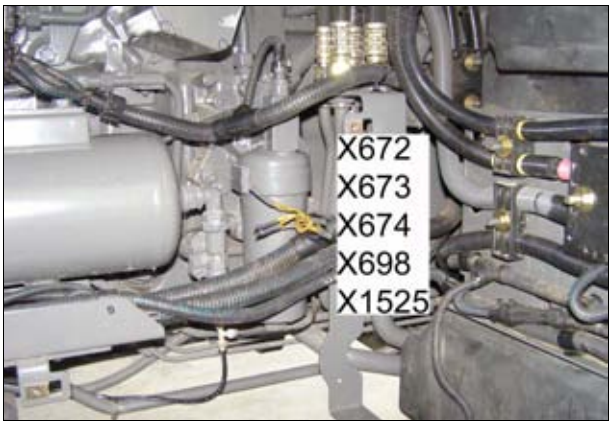


Fig. 219. I001276

X1528 - Connector, sensor system supply

Cab, right mudguard, bottom

Detach panel and floor mat

Fig. 220. I001291

X1532 - Separation point on B077

On left side of engine

Open bonnet.

Fig. 221. I008326

X1539 - ISO bus diagnostics socket

Cab, right mudguard, top

Detach cover

Fig. 222. I001209

X1565 - Connector, position light
X1578 - Connector, + UB 15

Cab, right mudguard, top

Detach panel

Fig. 223. I001204

X1586 - V bus cable coupling (Auto-Guide)
X1587 - Cable coupling, Y087

Right side of transmission.

Detach right rear wheel and panel

Fig. 224. I001298

X1590 - Separation point on S079
X1591 - Separation point on S079

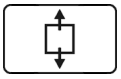
Cab, left side of steering column

Detach panel

Fig. 225. I008327

X1597 - Cable coupling A059

Cab, right mudguard, top

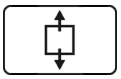


Detach panel

Fig. 226. I001220

X1600 - Cable coupling, to rear work lights (roof)

Below cab, on left



Detach housing from cab air filter

Fig. 227. I001292

X1611 - Separation point on X400 PCB, ISO (bus terminal)
X1612 - Separation point on X400 PCB, ISO (bus terminal)

Rear of tractor, right

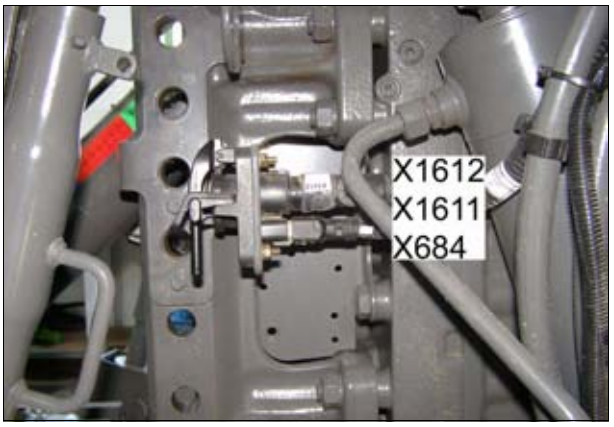


Fig. 228. I001280

X1624 - Cable coupling to front position lights

Right side of cab, front

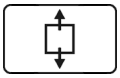
Fig. 229. I001252

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-

X1633 - Separation point, Auto-Guide TopDock

NOTE: *Tractor without Auto-Guide*

Cab, front right loudspeaker



Detach front right loudspeaker

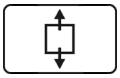
Fig. 230. I001293

X1633 - Separation point, Auto-Guide TopDock

NOTE: *Tractor with Auto-Guide*

The connector **X1633** - Separation point, Auto-Guide Top-Dock is disconnected and both **X4000** - Separation point on X1633_ P and **X4001** - Separation point on X1633_ S connectors are connected accordingly

Cab, front right loudspeaker



Detach front right loudspeaker

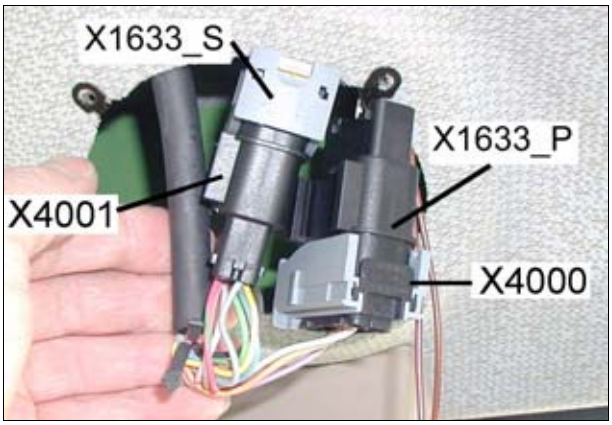
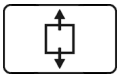


Fig. 231. I008243

X1634 - Connector (+ UB 30)

Cab, right mudguard, top

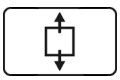


Detach panel

Fig. 232. I001204

X1635 - Cable coupling, operator platform

Cab, right mudguard, bottom

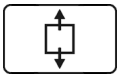


Detach panel

Fig. 233. I001222

X1636 - Vario-Doc cable coupling

Cab, right mudguard, bottom

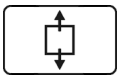


Detach panel

Fig. 234. I001302

X1637 - Connector, ISO bus_Low (A055 Vario-Doc)
X1638 - Connector, ISO bus_High (A055 Vario-Doc)
X1639 - Connector, K bus_High
X1640 - Connector, K bus_Low

Cab, right mudguard, bottom



Detach panel

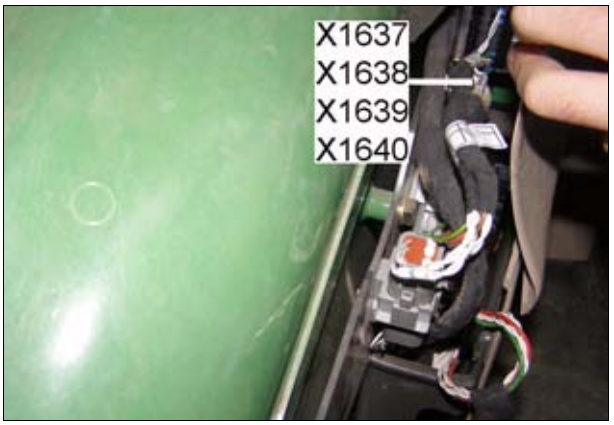
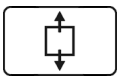


Fig. 235. I003190

X1648 - Separation point on K065

Right side of engine



Open bonnet.

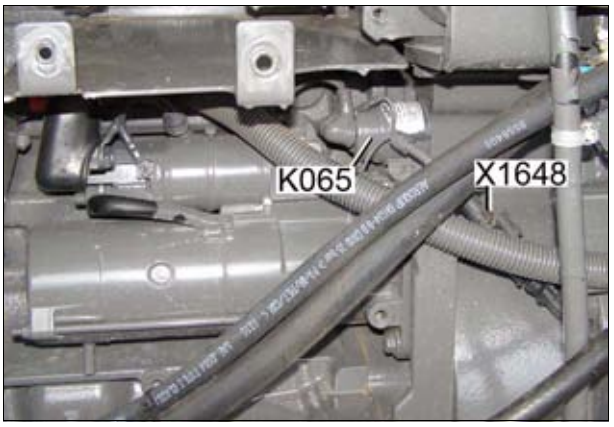
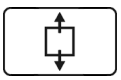


Fig. 236. I001194

X1649 - Separation point, 10 amp socket

Cab, right mudguard, bottom



Detach panel

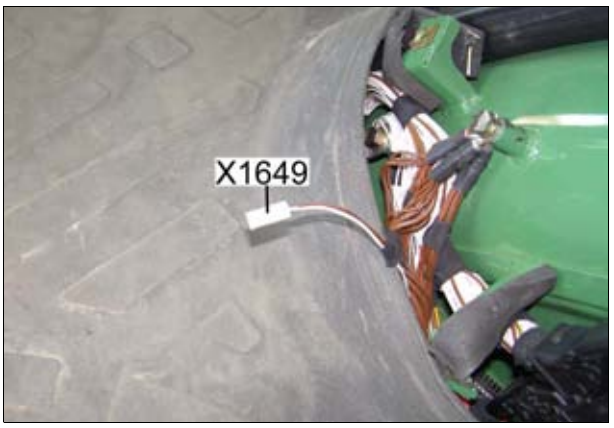


Fig. 237. I001221

X1669 - Separation point on U002
X1670 - Separation point on U002

Cab, glued to inside of roof.

Remove roof lining.

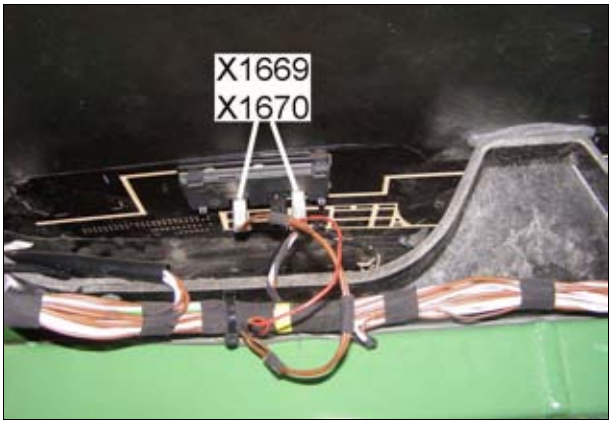


Fig. 238. I002490

X1673 - Cylinder head cable coupling (injectors)

On left side of engine

Open bonnet.

Fig. 239. I004022

X1674 - Separation point on Y094

Left side of engine, beside exhaust gas recirculation.

Open bonnet.

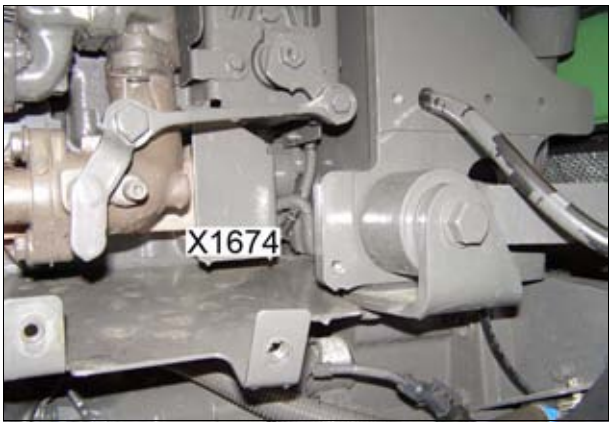


Fig. 240. I001848

X1675 - Connector, earth
X1676 - Connector + UB 12 VDC

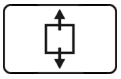
Engine wiring harness between cab and engine bulkhead
Distance from connector X1671 to X1675 = > 480mm
Distance from connector X1671 to X1676 = > 730mm

Open bonnet.

Fig. 241. I003560

X1677 cable coupling EDC

On left side of engine

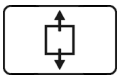


Open bonnet.

Fig. 242. I004022

X1678 - Connector, front work light

Cab, right mudguard, bottom

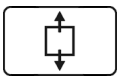


Detach panel

Fig. 243. I001294

X1681 - Cable coupling, E051

Cab, front right loudspeaker

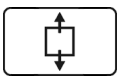


Detach front right loudspeaker

Fig. 244. I001295

X1682 - Cable coupling, E050

Cab, front left loudspeaker

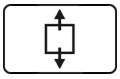


Detach front left loudspeaker

Fig. 245. I001296

X1683 - Cable coupling, camera socket

Cab, right mudguard, top

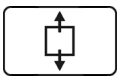


Detach panel

Fig. 246. I001297

X1729 - Connector, ISO bus_Low
X1730 - Connector, ISO bus_Low
X1731 - Connector, ISO bus_High
X1734 - Connector, ISO bus_High
X1735 - Connector, earth (Auto-Guide)
X1740 - Connector, Auto-Guide (+UB 15)
X1742 - Connector, Auto-Guide (+UB 30)

Cab, right mudguard, top



Detach panel

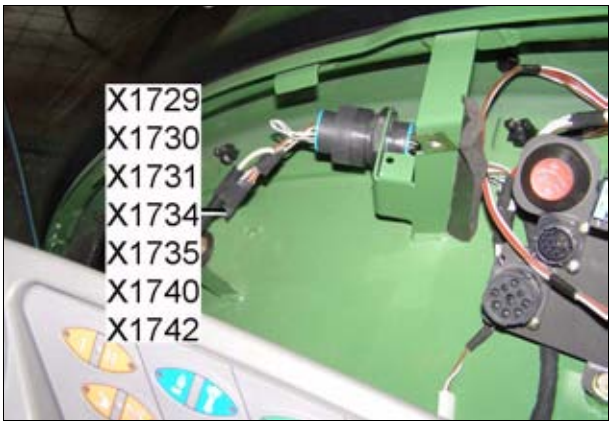


Fig. 247. I003189

X1751 - Separation point, left frame earth point

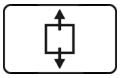


Fig. 248. I000001

X1767 - Separation point on radio to B050/B051

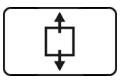


Fig. 249. I000001

X1787 - Connector, + UB 15

Cab, steering column

Detach panel

Fig. 250. I001297

X1802 - Separation point on E116 / E117

Fig. 251. I000001

X1806 - +UB 30 distributor

Right side of tractor, on the right tank.

Detach panel

Fig. 252. I008245

X4002 - Auto-Guide diagnostics socket

Cab roof compartment

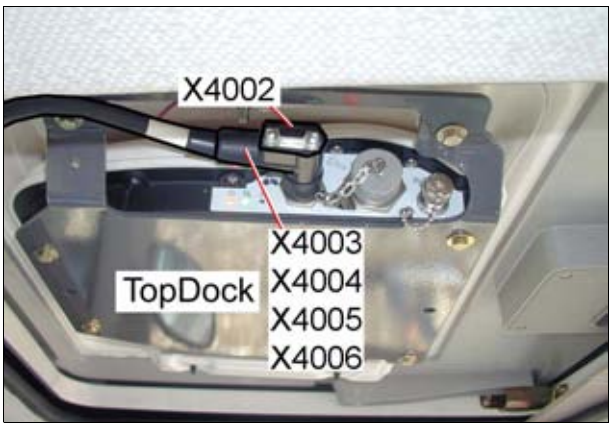


Fig. 253. I008244

X4003 - Connector, ISO bus_Low
X4004 - Connector, ISO bus_High
X4005 - Connector, V bus_Low
X4006 - Connector, V bus_High

NOTE: *The connectors are not routed outwards, but are cast in the plastic casing*

Cab roof compartment

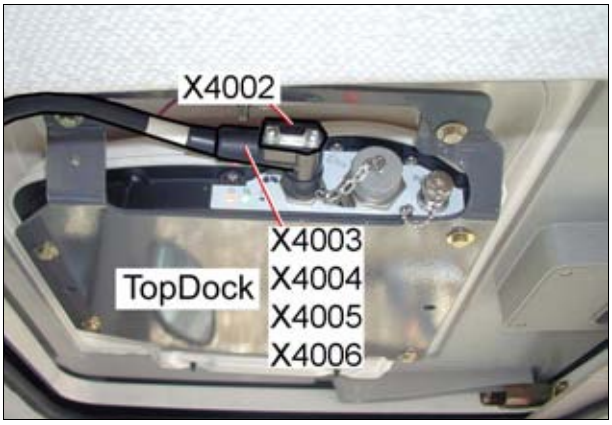


Fig. 254. I008244

X4007 - Earth pin, operator platform

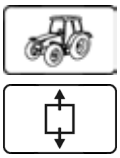


Fig. 255. I000001

X4024 - Connector, earth E020

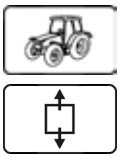


Fig. 256. I000001

X4091 - Connector, +UB 15 on A078

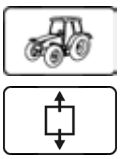


Fig. 257. I000001

X5028 - Connector, cab earth pin

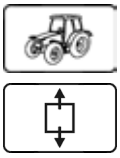
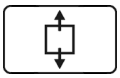


Fig. 258. I000001

11 Electrical/electronic components - Y

Y002 - Solenoid valve, travel range I
Y003 - Solenoid valve, travel range II
Y004 - Solenoid valve, turbo-clutch
Y005 - Solenoid valve, speed governor

Right side of transmission, transmission valve block



Detach right rear wheel and panel

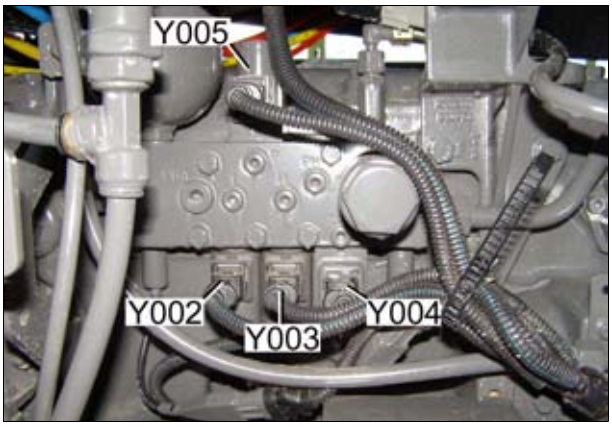


Fig. 259. I001161

Y006 - Solenoid valve, engine brake

At top in engine compartment, left side of engine

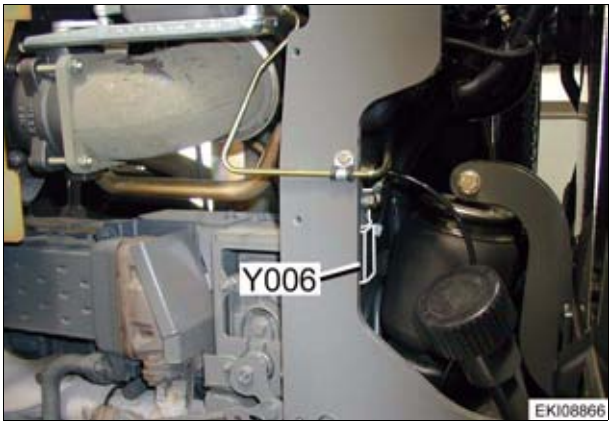
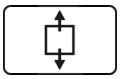


Fig. 260. I003264

Y008 - Solenoid valve, rear PTO (clutch)
Y009 - Solenoid valve, 4WD
Y010 - Solenoid valve, differential lock

Rear axle housing at top, below cab



Detach left rear wheel

Fig. 261. I001168

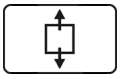
Y011 - Front PTO solenoid valve (clutch)

Right front PTO housing

Fig. 262. I001162

Y012 - Oil pre-heater/load suspension solenoid valve

Right side of tractor, central valve block

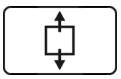


Detach panel

Fig. 263. I001173

Y021 - Lifting solenoid valve (standard front power lift)
Y022 - Lowering solenoid valve (standard front power lift)

Right side of tractor, central valve block



Detach panel

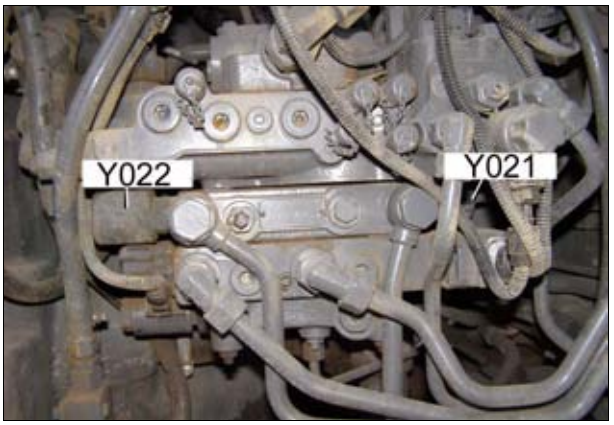
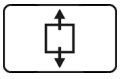


Fig. 264. I001714

Y021 - Front pressure compensator lock valve front power lift enhanced control

Right side of tractor, central valve block



Detach panel

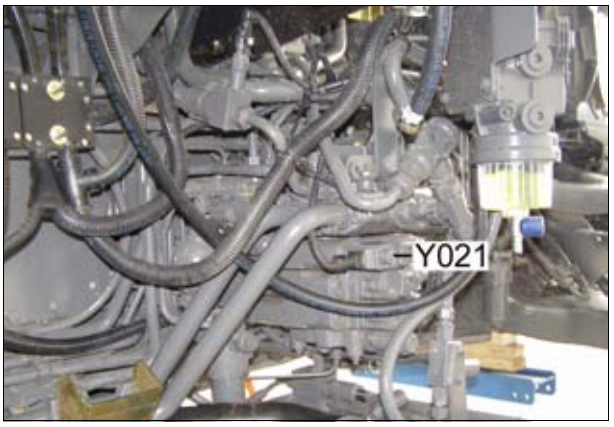


Fig. 265. I001715

Y022 - Field pressure control solenoid valve (front), front power lift enhanced control

Right side of engine

Fig. 266. I001716

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-

Y024 - Magnetic clutch, air conditioning compressor

On left side of engine

Open bonnet.

Fig. 267. I001163

Y026 - Solenoid valve, rear PTO, stage I
Y027 - Solenoid valve, rear PTO, stage II

Rear axle housing at top, below cab

Detach left rear wheel

Fig. 268. I001168

Y032 - Control pressure solenoid valve

Right side of tractor, central valve block

Detach panel

Fig. 269. I001174

Y053 - Active hold function solenoid valve

Right side of transmission.

Detach right rear wheel and panel

Fig. 270. I001303

Y055 - Rear pressure compensator lock valve

Rear of tractor, rear valve block

Detach cover panel

Fig. 271. I001175

Y060 - Hydraulic oil pre-heater solenoid valve (rear)

Rear of tractor, rear valve block

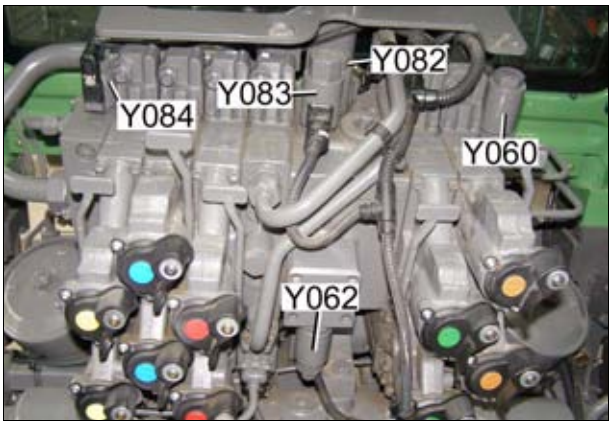


Fig. 272. I001169

Y061 - hydraulic oil pre-heater solenoid valve (middle)

Right side of tractor, central valve block

Detach panel

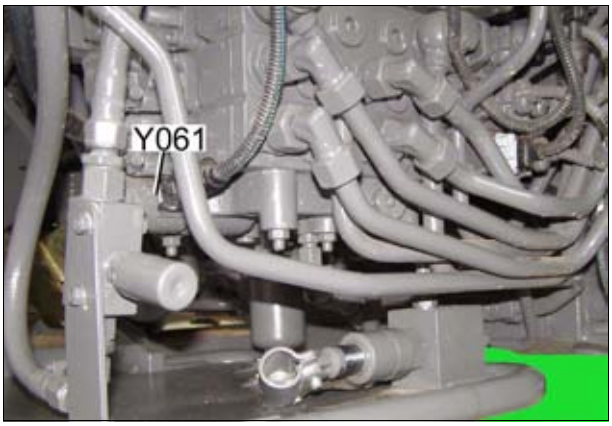


Fig. 273. I001176

Y062 - Solenoid valve, field pressure control (rear)

Rear of tractor, rear valve block

Detach cover

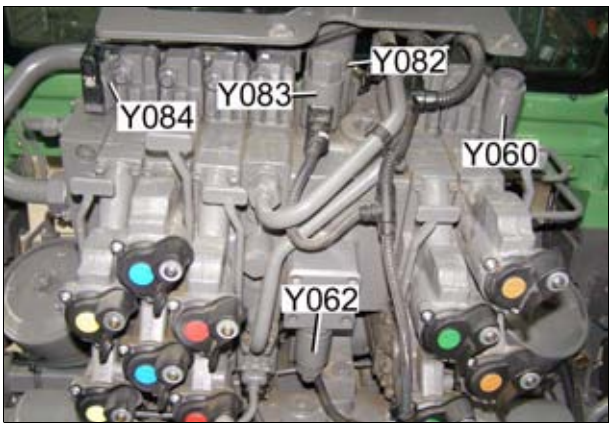


Fig. 274. I001169

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-

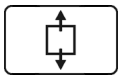
Y063 - Wobble stabiliser solenoid valve

Left side of tractor, behind left fuel tank.

Fig. 275. I001177

Y064 - Suspension load pressure/lowering solenoid valve

Right side of tractor, central valve block



Detach panel

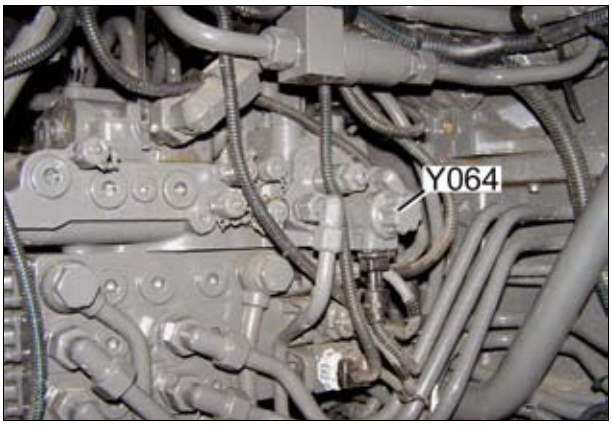
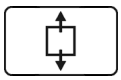


Fig. 276. I001165

Y065 - Raise suspension solenoid valve

Right side of tractor, central valve block



Detach panel

Fig. 277. I001178

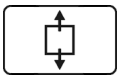
Y067 - Lock suspension solenoid valve

Left side of tractor, behind left fuel tank.

Fig. 278. I001177

Y070 [FKH] - Cut-off valve, front power lift enhanced control
Y071 [2.1] - Auxiliary control valve (olive)
Y072 [2.2] - Auxiliary control valve (grey)

Right side of tractor, central valve block



Detach panel

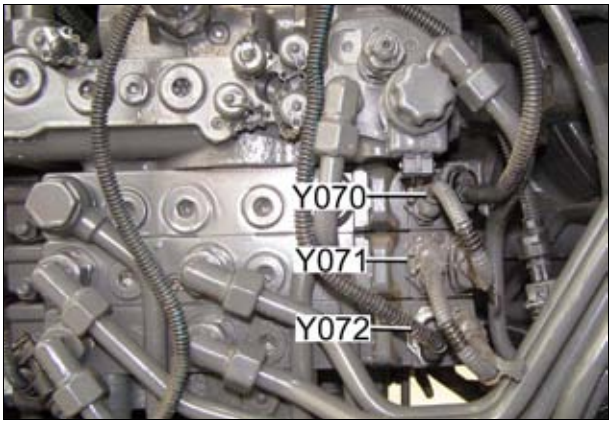


Fig. 279. I001179

Y074 [1.1] - Auxiliary control valve (yellow)
Y075 [1.2] - Auxiliary control valve (blue)
Y076 [1.3] - Auxiliary control valve (red)
Y077 [HKH] - Cut-off valve, rear EPC
Y078 [1.4] - Auxiliary control valve (green)
Y079 [1.5] - Auxiliary control valve (brown)
Y080 [1.6] - Auxiliary control valve (violet)

Rear of tractor, rear valve block

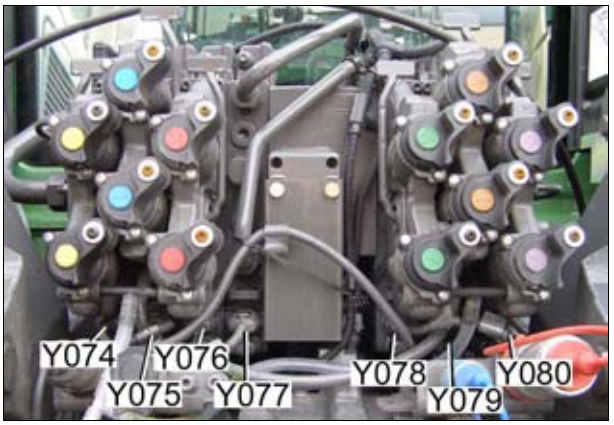
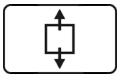


Fig. 280. I001180

Y082 - Solenoid valve, lower link stabiliser, lock
Y083 - Solenoid valve, lower link stabiliser, release
Y084 - Solenoid valve, Power Beyond

Rear of tractor, rear valve block



Detach cover panel

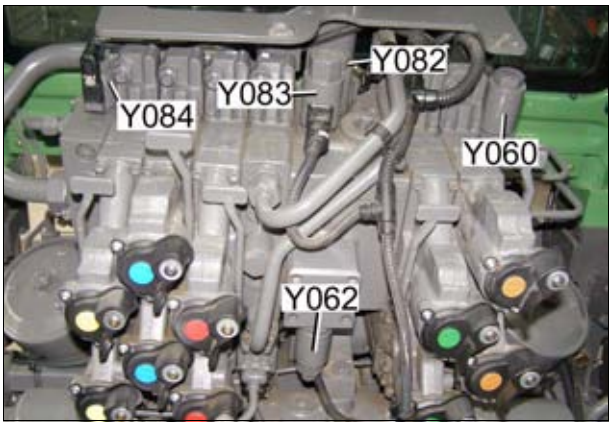
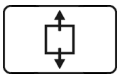


Fig. 281. I001169

Y085 - Pilot pressure/switch-off solenoid valve (Auto-Guide)
Y086 - Solenoid valve, steering disconnect (Auto-Guide)
Y087 - Steering valve block, Auto-Guide

Right side of transmission.



Remove right rear wheel and panel.

Fig. 282. I001987

Y088 - Solenoid valve, release trailer brake

Right side of transmission

Detach right rear wheel and panel

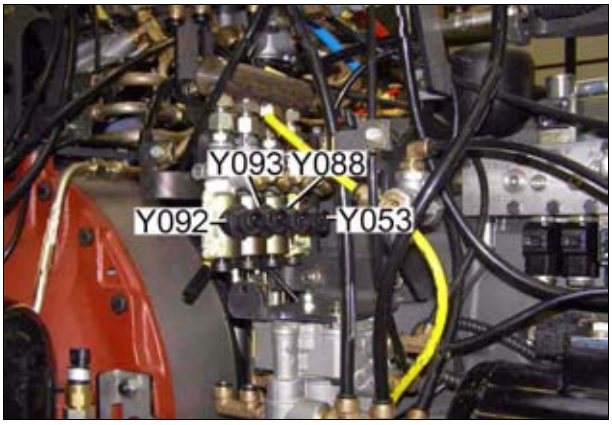


Fig. 283. I001303

Y091 - Dispensing unit (fuel)

Right side of engine

Open bonnet.

Fig. 284. I001172

Y092 - Solenoid valve, reverse operation (RÜFA), rotate to left
Y093 - Solenoid valve, reverse operation (RÜFA), rotate to right

Right side of transmission.

Detach right rear wheel and panel

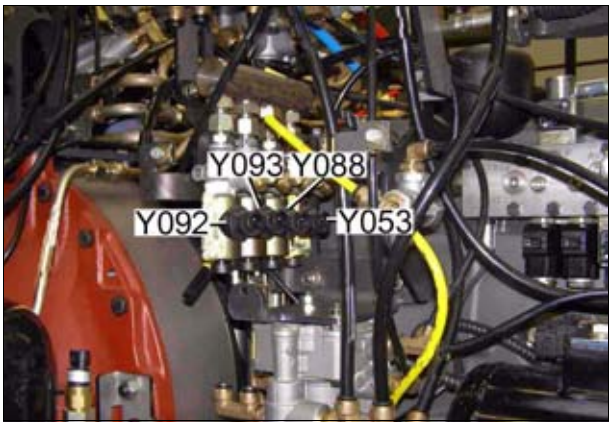


Fig. 285. I001303

Y094 - Actuator unit, AGR (exhaust gas recirculation)

On the left of the engine

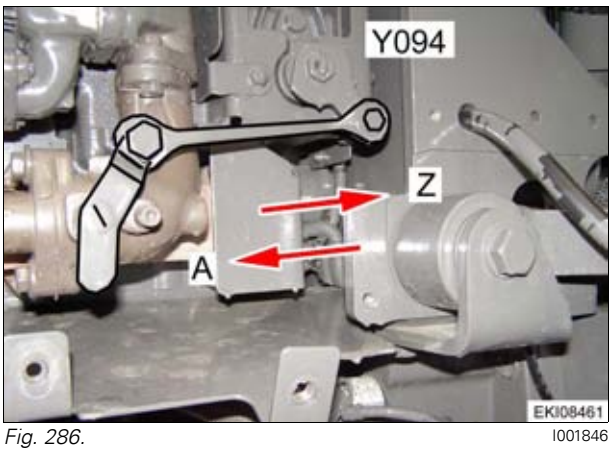


Fig. 286. I001846

Y095 - Injector valve 1 (injector)
Y096 - Injector valve 2 (injector)
Y097 - Injector valve 3 (injector)
Y098 - Injector valve 4 (injector)
Y100 - Injector valve 5 (injector)
Y101 - Injector valve 6 (injector)

Fig. 287. I000001

12 Hydraulic components

APE - Entry plate with ext. Pressure supply

Rear valve block

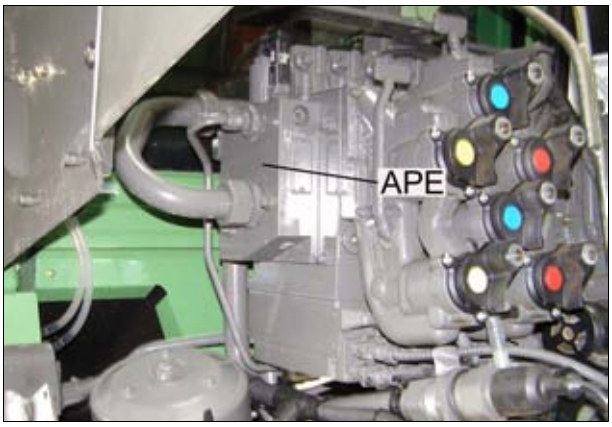


Fig. 288. I000823

ASP1 - Accumulator, suspension 1
ASP2 - Accumulator, suspension 2

Left side of tractor, in VBF

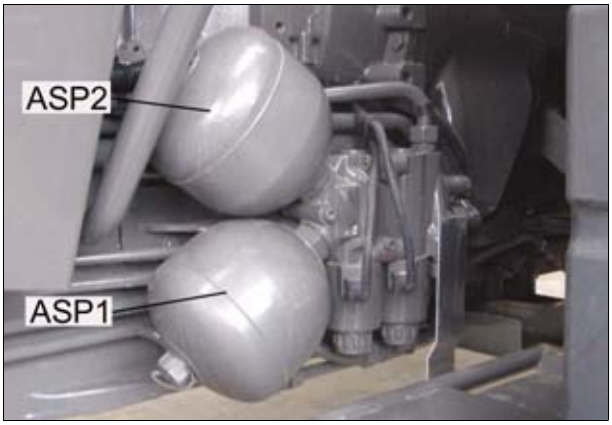
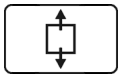


Fig. 289. I000811

AVF1 - Lock valve, suspension 1
AVF2 - Lock valve, suspension 2

Right side of tractor, in ZSB



Detach panel

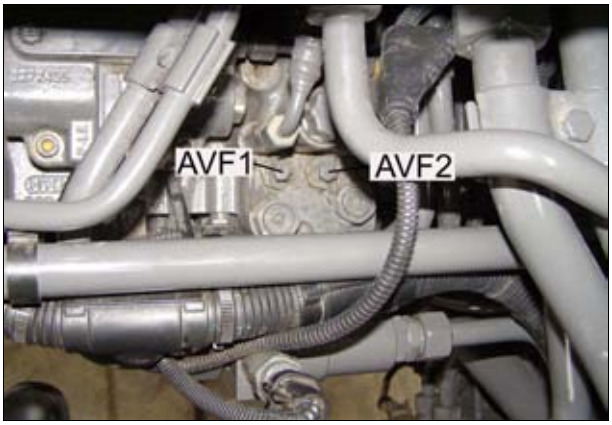


Fig. 290. I000803

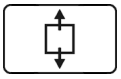
BF - Ventilation filter

Left side of tractor, in front of cab

Fig. 291. I000787

DBV1 - Main pressure-limiting valve

Right side of tractor, in ZSB



Detach panel

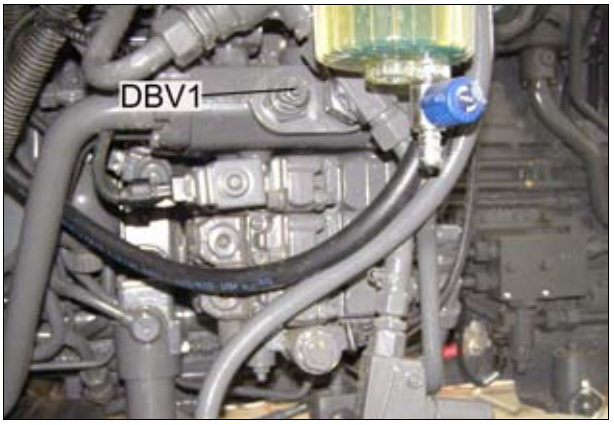
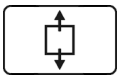


Fig. 292. I000794

DBVF1 - Pressure-limiting valve, suspension 1

Right side of tractor, in ZSB



Detach panel

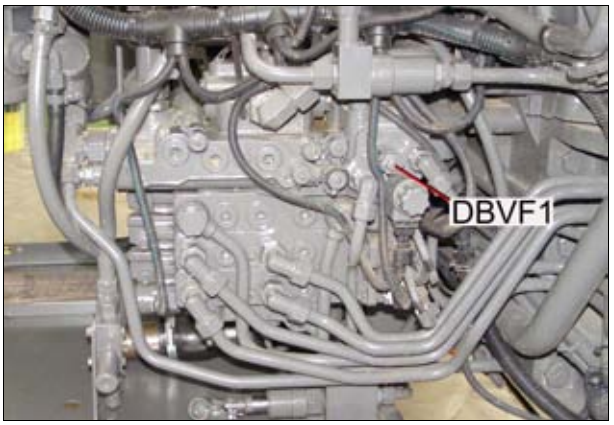
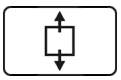


Fig. 293. I000800

DBVF2 - Pressure-limiting valve, suspension 2

Left side of tractor, in VBF



Pull forward left fuel tank

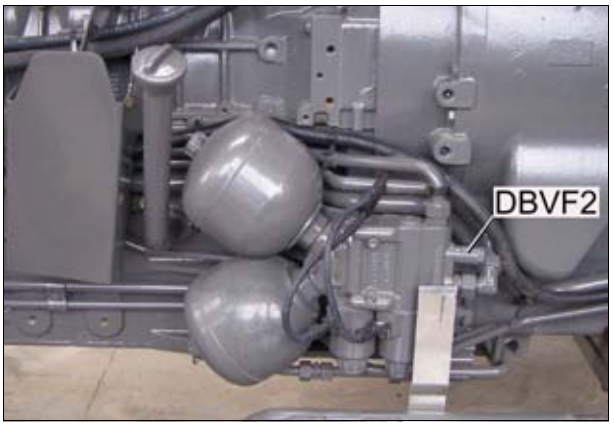


Fig. 294. I000810

DBVKF [Y022] - Field pressure valve, DA front power lift enhanced control

Right side of tractor, on engine

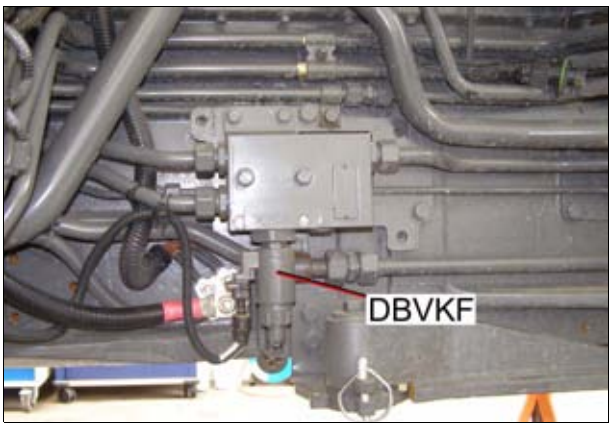


Fig. 295. I000841

DBVKH [Y062] - Field pressure valve, DA rear power lift

Rear valve block

Fig. 296. I000839

DBV-L - Pressure-limiting valve, 175 bar steering

Right side of tractor, in ZSB

Detach panel

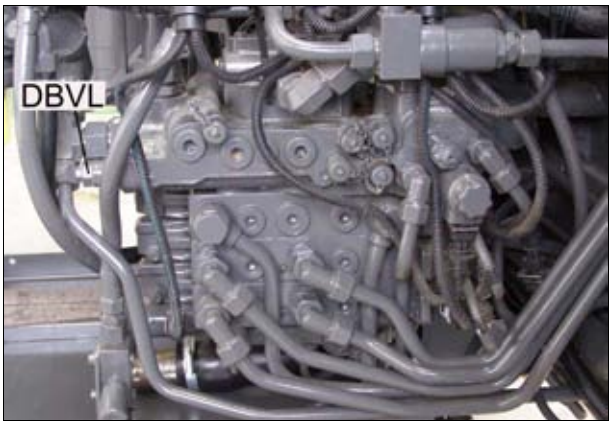


Fig. 297. I000805

DFE - Pressure filter, external LS

Rear valve block, in APE

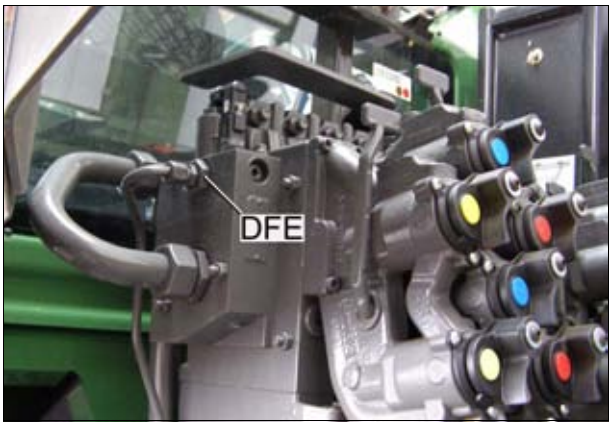


Fig. 298. I000826

DFP - Pressure filter, pilot pressure

Right side of tractor, central valve block

Detach panel

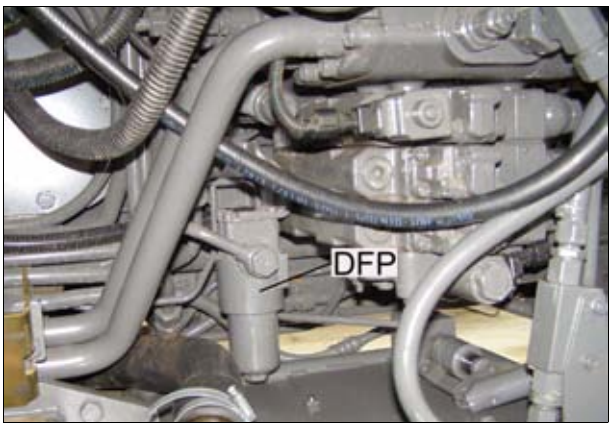
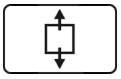


Fig. 299. I000815

DFWH - Flow monitor, auxiliary pump

Right side of tractor, central valve block



Detach panel

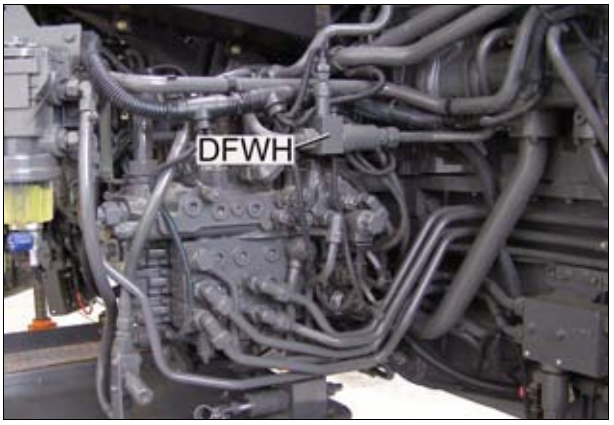
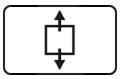


Fig. 300. I000848

DFWN - Flow monitor, emergency steering pump

Right side of tractor, central valve block



Detach panel and right fuel tank

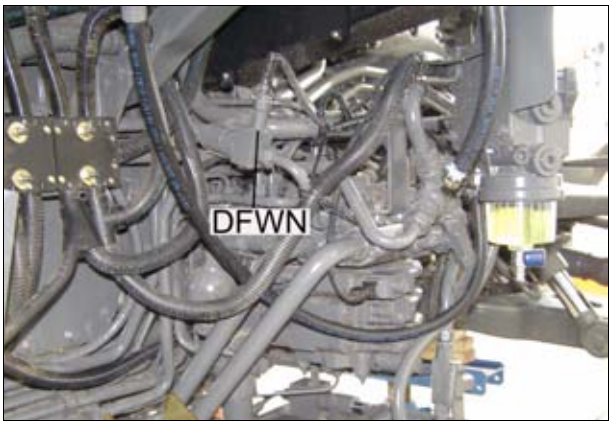


Fig. 301. I000783

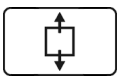
DRVE [Y084] - Pressure cut-off valve, Power Beyond

Rear valve block, in APE

Fig. 302. I000824

DRVF - Pressure-limiting valve, suspension

Right side of tractor, in ZSB



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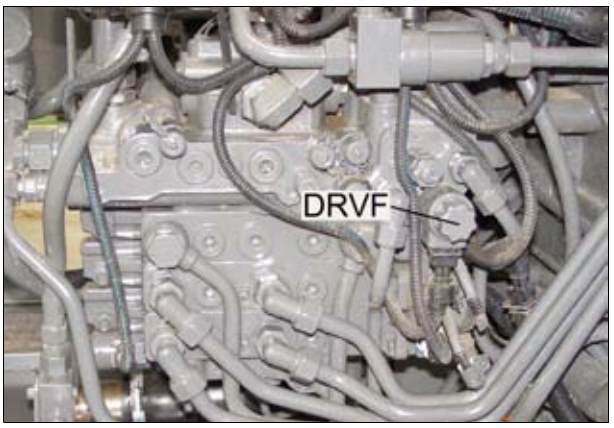
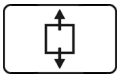


Fig. 303. I000797

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-

DRVP - Pressure cut-off valve, pilot pressure

Right side of tractor, in VBP



Detach panel and right fuel tank

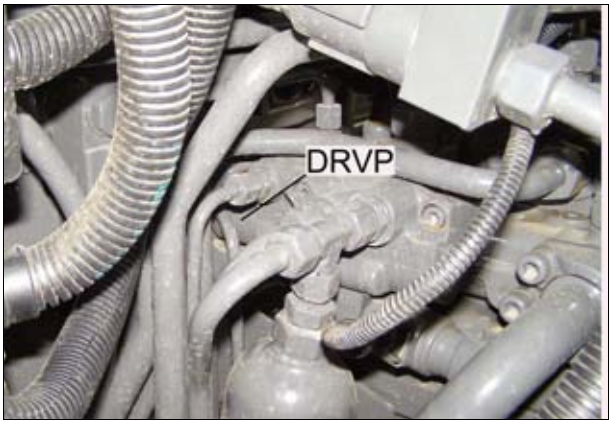
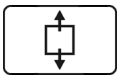


Fig. 304. I000816

DS1 - Pressure switch, LS pump monitor

Right side of tractor, ZSB top



Detach panel

Fig. 305. I000793

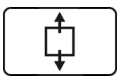
DSF [B063] - Pressure switch, filter monitor

Top clutch housing

Fig. 306. I000785

DWKF - Pressure compensator, front power lift, SA

Right side of tractor, standard front power lift valve.



Detach panel

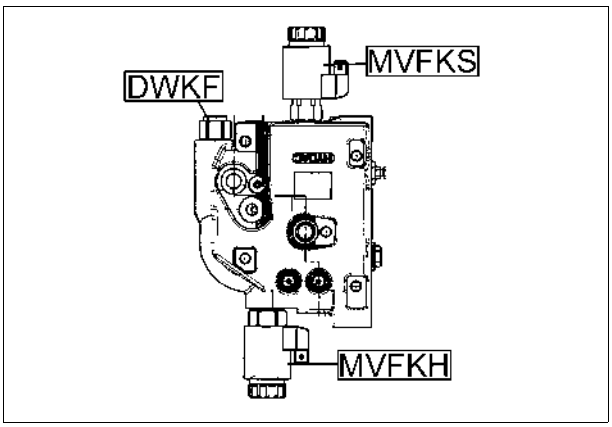


Fig. 307. I001646

DWL - Pressure compensator, steering

Right side of tractor, in VBL

Detach panel

Fig. 308. I000821

DWP - Pressure compensator, pilot pressure

Right side of tractor, in VBP

Detach panel and right fuel tank

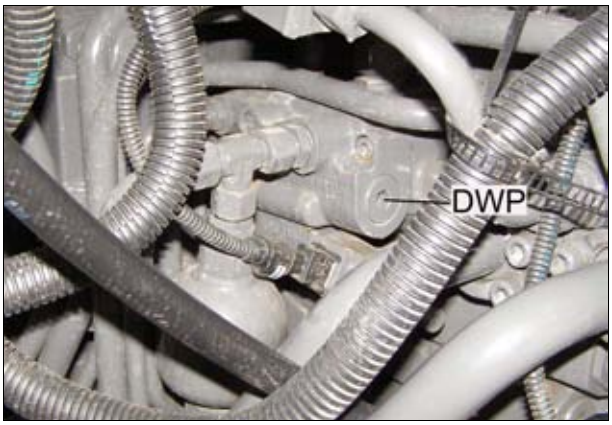


Fig. 309. I000814

EPH - End plate, rear valve block

Rear valve block

Fig. 310. I000833

EPM - End plate, centre

Right side of tractor, central valve block

Detach panel

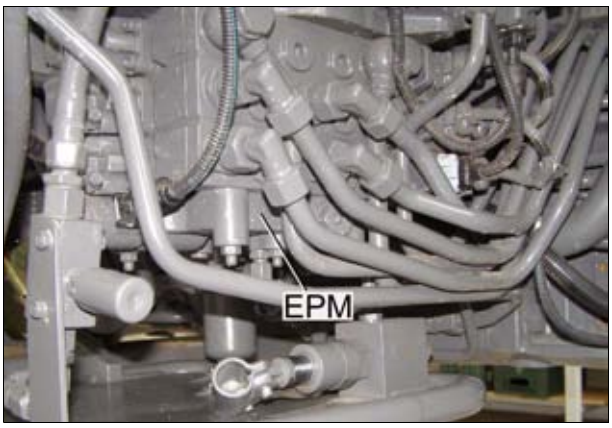


Fig. 311. I000836

FSP - Front power lift accumulator

Left side of tractor, on the front axle

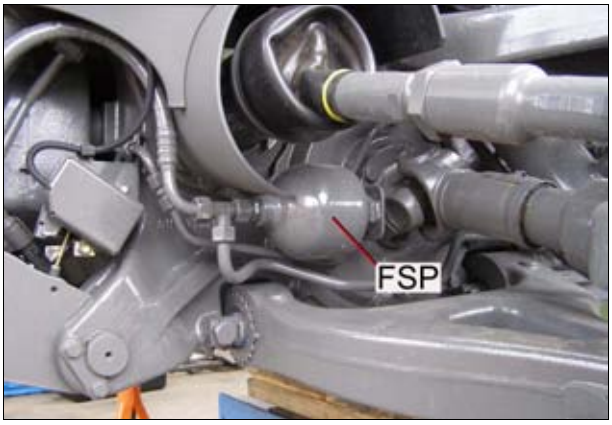


Fig. 312. I000842

FSS [B084] - Level switch

Top clutch housing, left

Fig. 313. I000786

GDR - Silencer, LS pump

In clutch housing

Remove right rear wheel, right fuel tank and clutch housing hatch cover

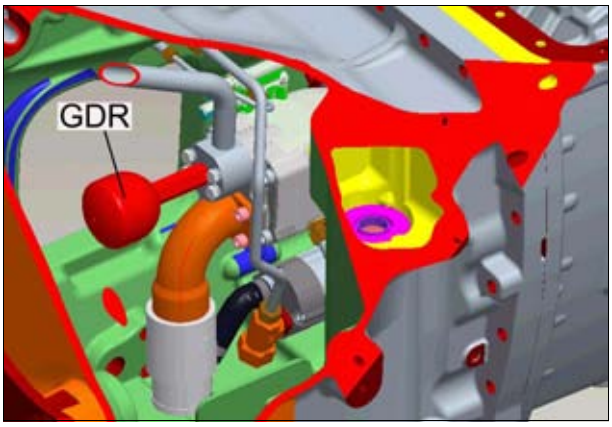


Fig. 314. I000778

HP - Hand pump, pilot pressure – emergency supply

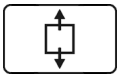
Right side of tractor, below central valve block

Detach panel

Fig. 315. I000788

Hy.ABV - Hydraulic trailer brake

Right side of tractor, central valve block



Detach panel

Fig. 316. I000822

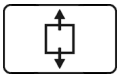
K - Hydraulic oil cooler

Front, below bonnet

Fig. 317. I000790

LE - Steering unit

Left side of tractor, by entrance step below cab

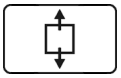


Detach cab air filter

Fig. 318. I001018

M1 - Measuring point, emergency pumps
M2 - Measuring point, auxiliary pumps
M3 - Measuring point, LS pump
M4 - Measuring point, LS pressure
M5 - Measuring point, control pressure

Right side of tractor, in ZSB



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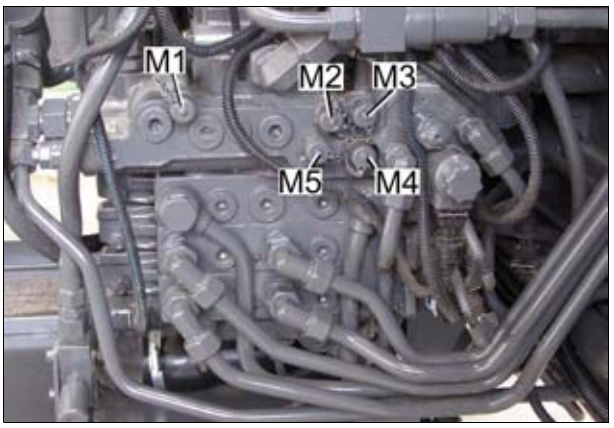
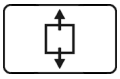


Fig. 319. I001210

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-

MVFF [Y067] - Solenoid valve, lock suspension

Left side of tractor, in VBF



Pull forward left fuel tank

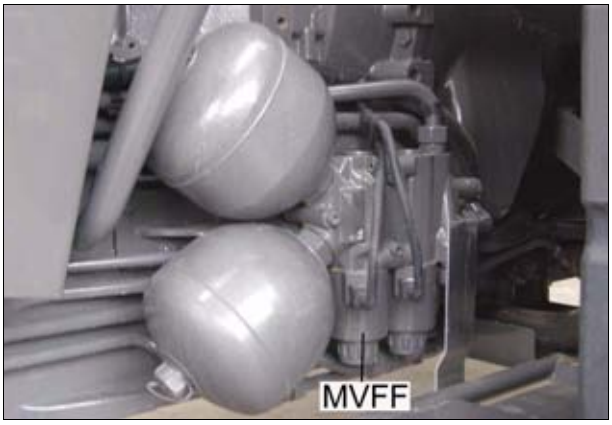
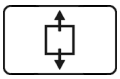


Fig. 320. I000807

MVFH [Y065] - Solenoid valve, raise suspension

Right side of tractor, in ZSB



Detach panel

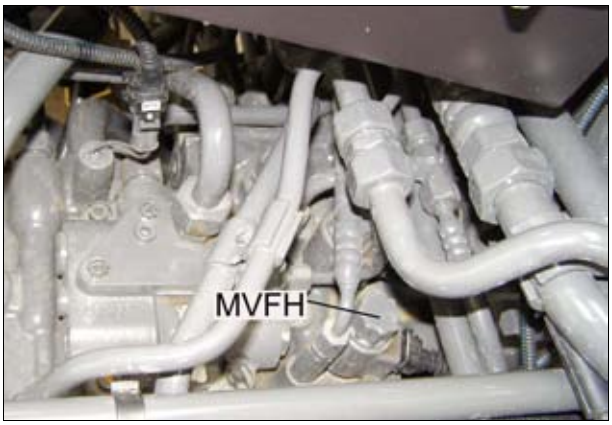
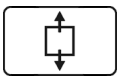


Fig. 321. I000796

MVFW [Y063] - Solenoid valve, wobble stabiliser

Left side of tractor, in VBF



Pull forward left fuel tank

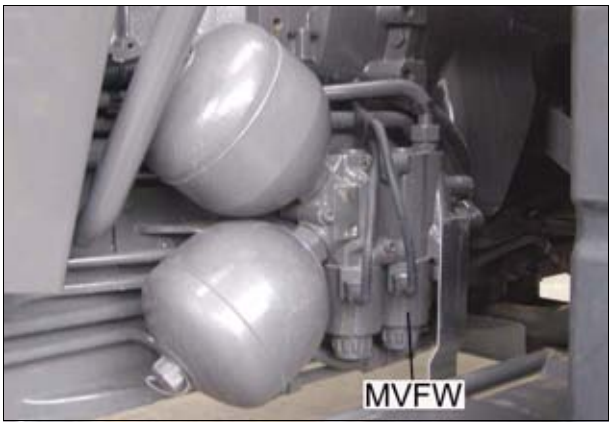
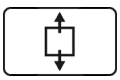


Fig. 322. I000809

MVKF [Y021] - Front pressure compensator lock valve (SA/DA)

Right side of tractor, central valve block



Detach panel

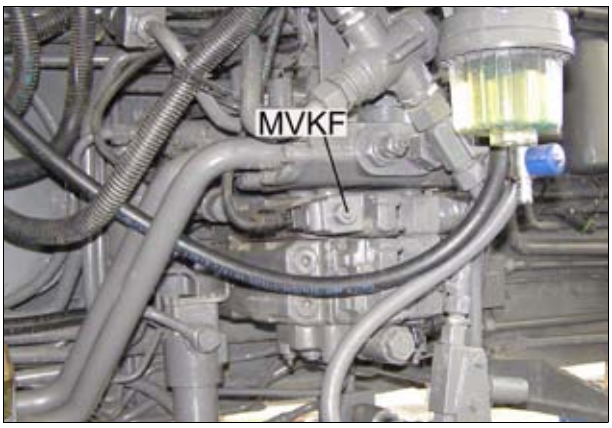
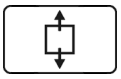


Fig. 323. I000840

MVKFH [Y021] - Lifting solenoid valve (standard front power lift)

Right side of tractor, central valve block (standard front power lift).



Detach panel

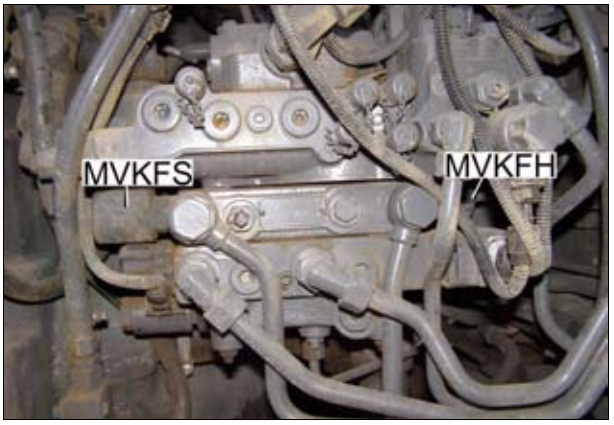


Fig. 324. I001647

MVKFS [Y022] - Lowering solenoid valve (standard front power lift)

Right side of tractor, central valve block (standard front power lift).

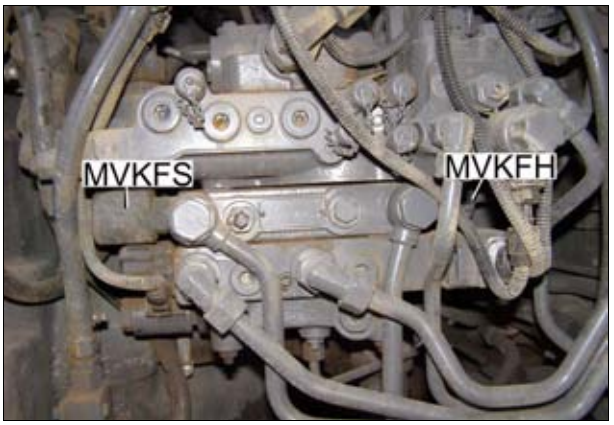
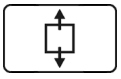


Fig. 325. I001647

MVKH [Y055] - Rear pressure compensator lock valve (SA/DA)

Rear valve block



Detach cover panel

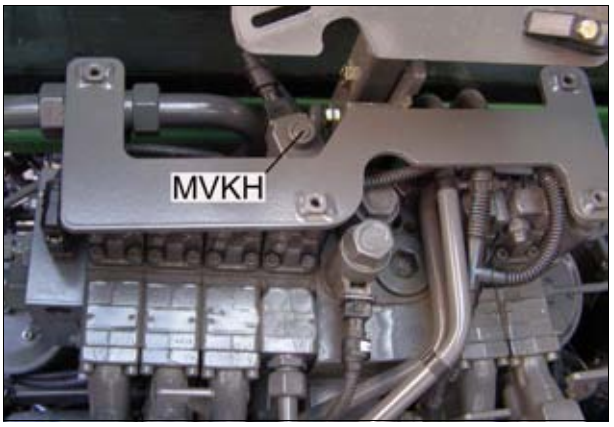
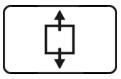


Fig. 326. I000838

MVL [Y012] - Solenoid valve, charge function (suspension, oil pre-heater)

Right side of tractor, in ZSB

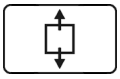


Detach panel

Fig. 327. I000795

MVP [Y032] - Solenoid valve, pilot pressure

Right side of tractor, in VBP

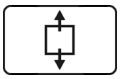


Detach panel and right fuel tank

Fig. 328. I000818

MVUL [Y082] - Solenoid valve, lower link stabiliser lock

Rear valve block



Detach cover panel

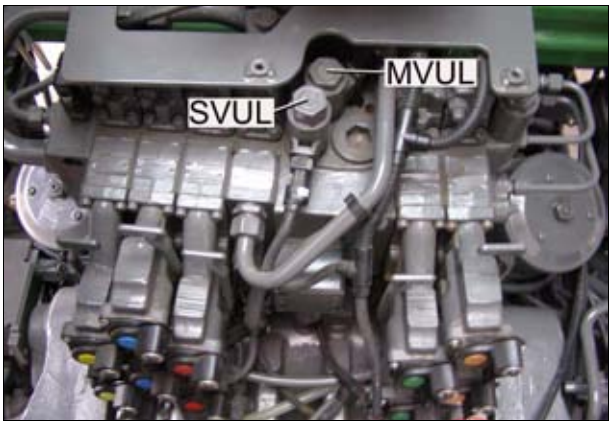


Fig. 329. I000835

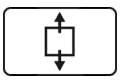
MVVH [Y060] - Solenoid valve, rear pre-heater

Rear valve block, in EPH

Fig. 330. I000834

MVVM [Y061] - Solenoid valve, central pre-heater

Right side of tractor, in EPM



Detach panel

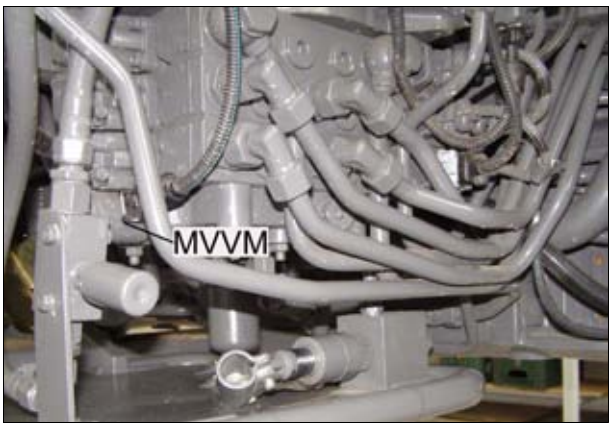


Fig. 331. I000837

OETR - Oil temperature regulator

Right side of tractor, central valve block

Detach panel

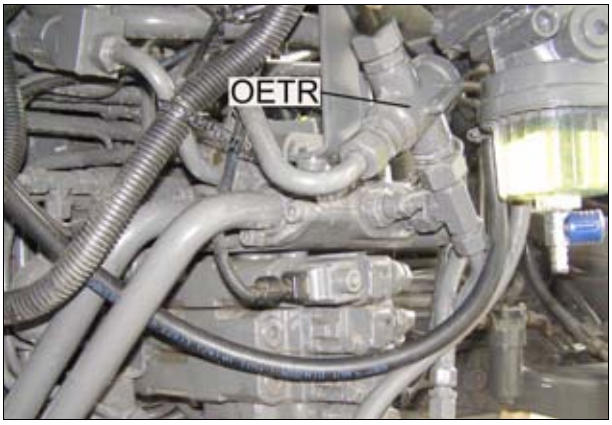


Fig. 332. I000789

PH - Auxiliary pump

Flange-mounted to right side of engine

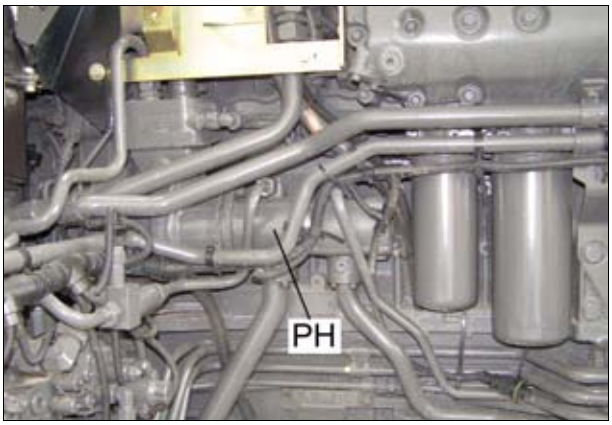


Fig. 333. I000779

PNL - Emergency steering pump

In clutch housing, flange-mounted to 4WD shaft

Remove right rear wheel, right fuel tank and clutch housing hatch cover

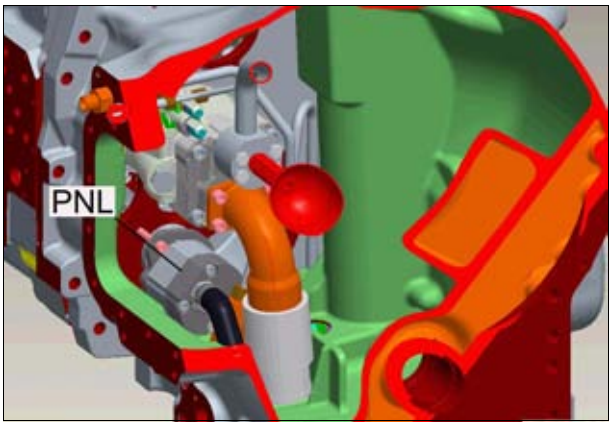


Fig. 334. I000844

PR - LS pump

In clutch housing

Remove right rear wheel, right fuel tank and clutch housing hatch cover

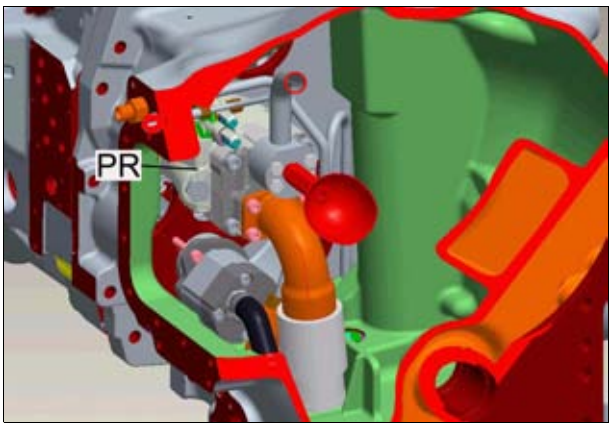
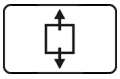


Fig. 335. I000776

PVL - Priority valve, steering

Right side of tractor, in VBL

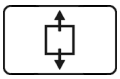


Detach panel

Fig. 336. I000820

RLF - Return line filter

Left side of clutch housing



Detach closing plate from clutch housing, bottom left

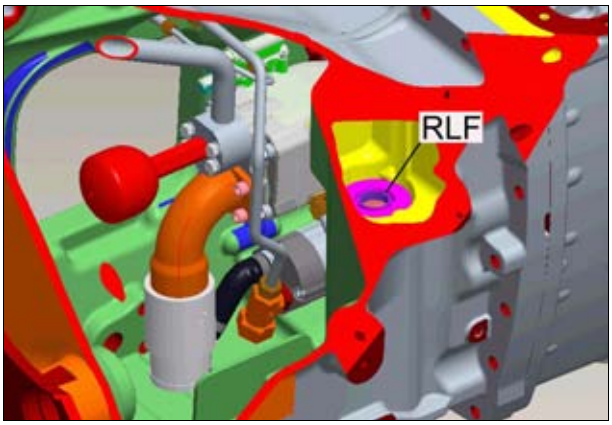
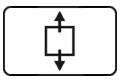


Fig. 337. I000784

RVF1 - Non-return valve, suspension 1

Right side of tractor, in ZSB



For RVF1, remove the entire ZSB.

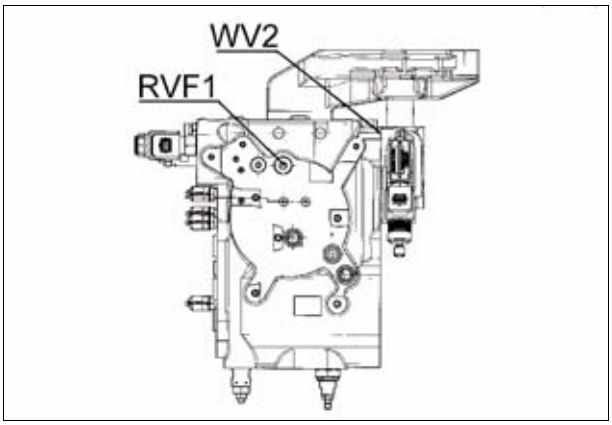
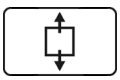


Fig. 338. I002245

RVFH - Non-return valve, raise suspension

Right side of tractor, in ZSB



Detach panel

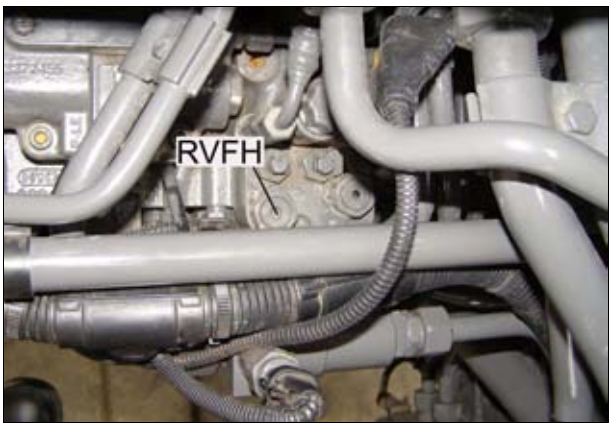
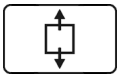


Fig. 339. I000798

RVFS - Non-return valve, lower suspension

Right side of tractor, in ZSB



Detach panel

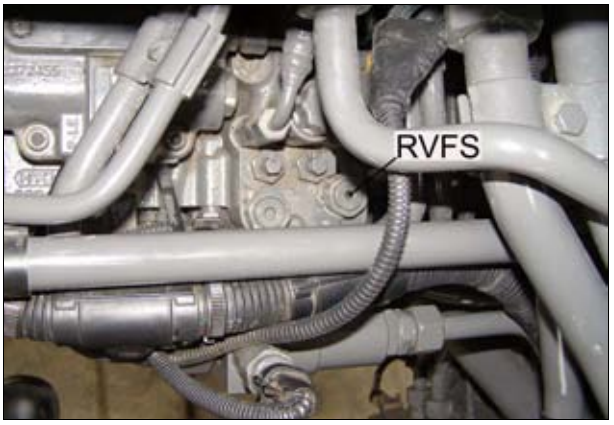
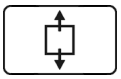


Fig. 340. I000799

RVL1-3 - Non-return valve, steering 1-3

Right side of tractor, in ZSB

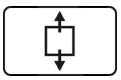


Detach panel

Fig. 341. I000925

RVN - Non-return valve, emergency steering pump

In clutch housing



Remove right rear wheel, right fuel tank and clutch housing hatch cover

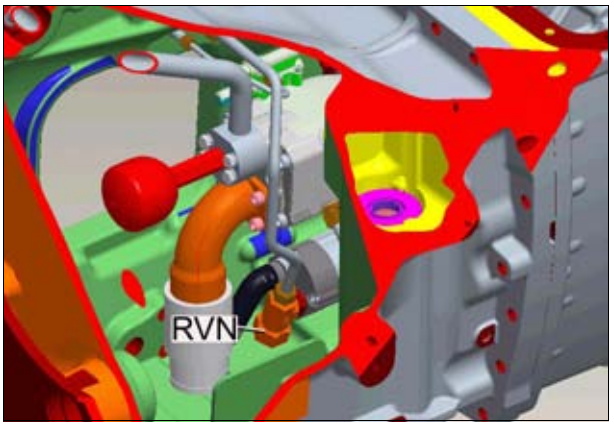
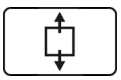


Fig. 342. I000922

SFH - Auxiliary pump suction filter

Right side of tractor, in suction line hose



Detach suction hose

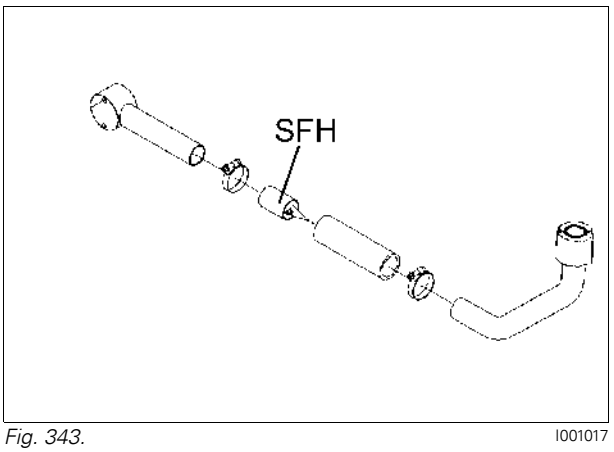


Fig. 343. I001017

SFN1+2 - Suction filter, emergency steering pump 1+2

In clutch housing

Remove right rear wheel, right fuel tank and clutch housing hatch cover

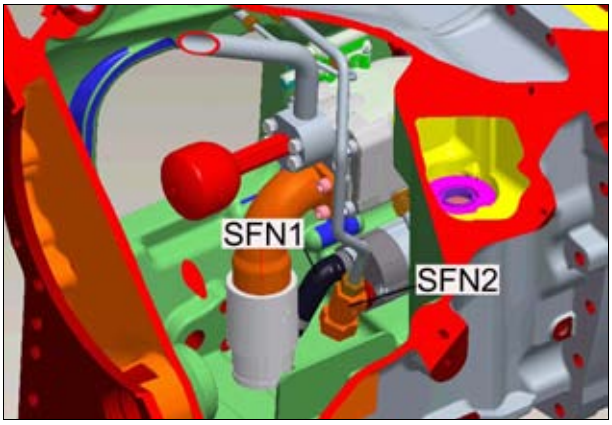


Fig. 344. I000782

SFR - Suction filter, LS pump

In clutch housing

Remove right rear wheel, right fuel tank and clutch housing hatch cover

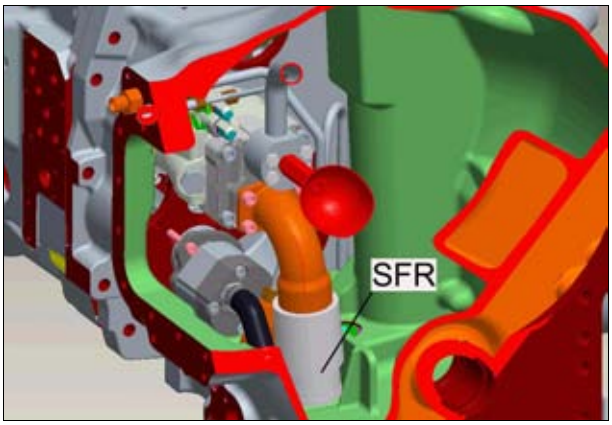


Fig. 345. I000777

SRVE - Flow cut-off valve, external LS relief

Rear valve block, in APE

Fig. 346. I000832

SVUL [Y083] - Solenoid valve, lower link stabiliser release

Rear valve block

Detach cover panel

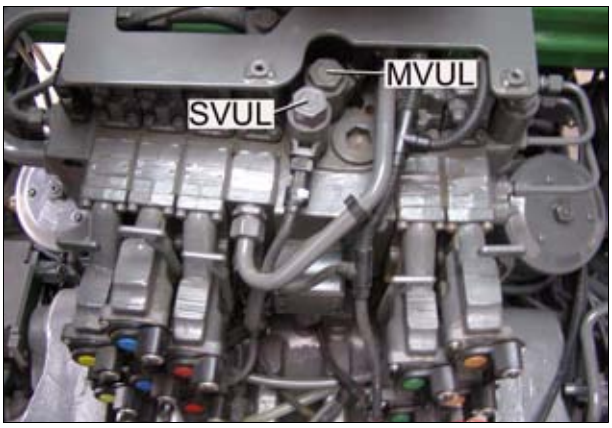


Fig. 347. I000835

TG [B013] - Temperature sensor

Right side of engine, suction line to auxiliary pump

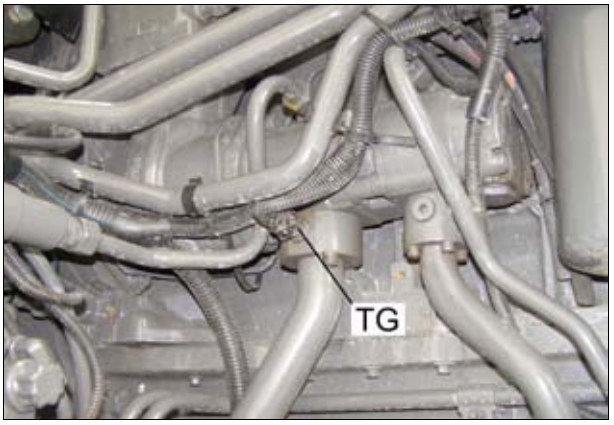
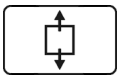


Fig. 348. I000781

VBF - Valve block, suspension

Left side of tractor, behind fuel tank



Pull forward left fuel tank

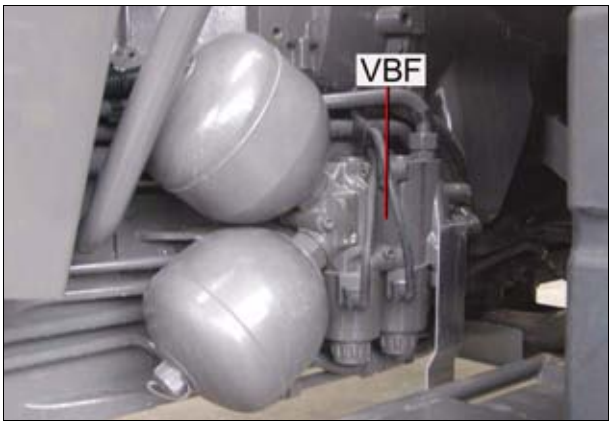
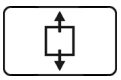


Fig. 349. I000806

VBL - Valve block, steering

Right side of tractor, central valve block

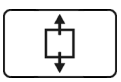


Detach panel

Fig. 350. I000819

VBP - Valve block, pilot pressure supply

Right side of tractor, central valve block



Detach panel and right fuel tank

Fig. 351. I000813

WV1 - LS shuttle valve 1

Right side of tractor, in ZSB

Detach panel

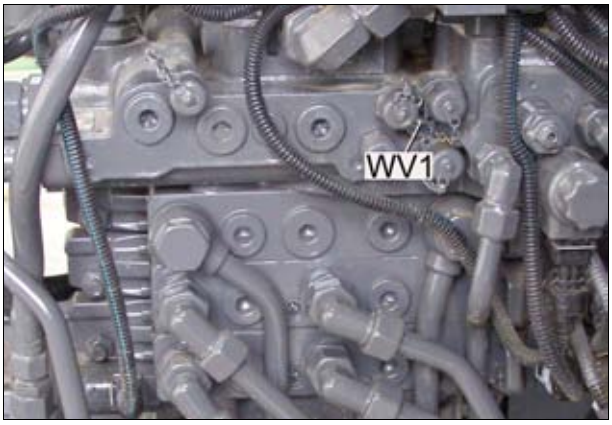


Fig. 352. I000923

WV2 - LS shuttle valve 2

Right side of tractor, in ZSB

Remove right rear wheel, remove right tank, remove VBP, shuttle valve 2 is located behind the VBP.

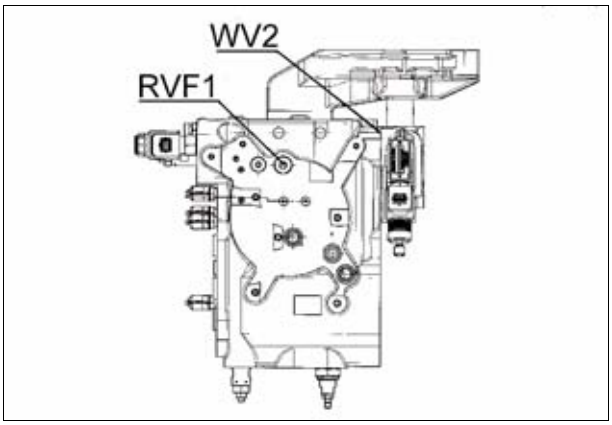


Fig. 353. I002245

WVP - Shuttle valve, pilot pressure

Right side of tractor, in VBP

Detach panel and right fuel tank

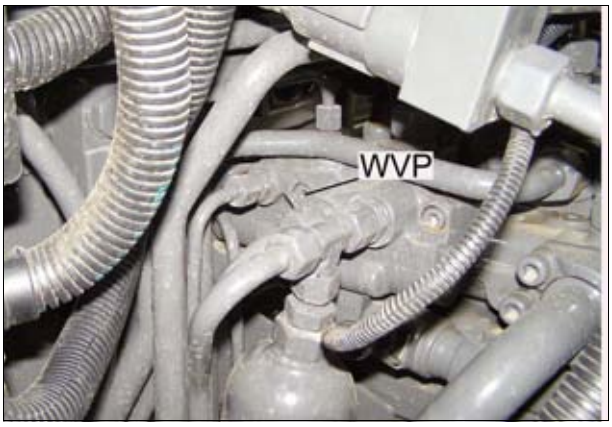


Fig. 354. I000817

ZF1 - Federungszylinder 1

Left of front axle

Fig. 355. I003950

ZF2 - Federungszylinder 2

Front axle, right

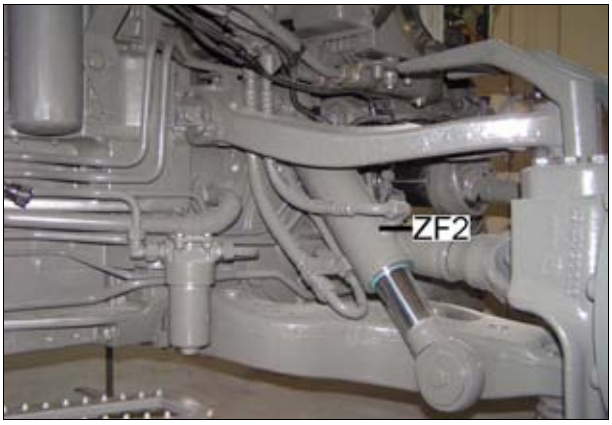


Fig. 356. I003951

ZL - Steering cylinder

Front axle

Fig. 357. I000897

ZSB - Central control block

Right side of tractor, central valve block

Detach panel

Fig. 358. I000792

ZSP - Auxiliary accumulator, suspension

Left side of tractor, on engine

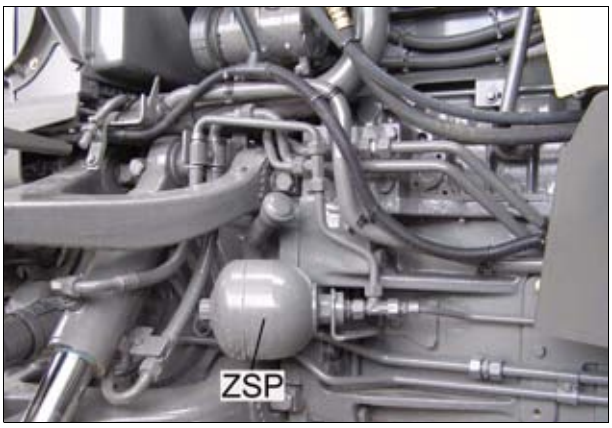


Fig. 359. I000812

Electro-hydraulic steering system (Autoguide)

APLE - Connection plate for el.-hyd. steering system

Right side of transmission.

Remove right rear wheel.

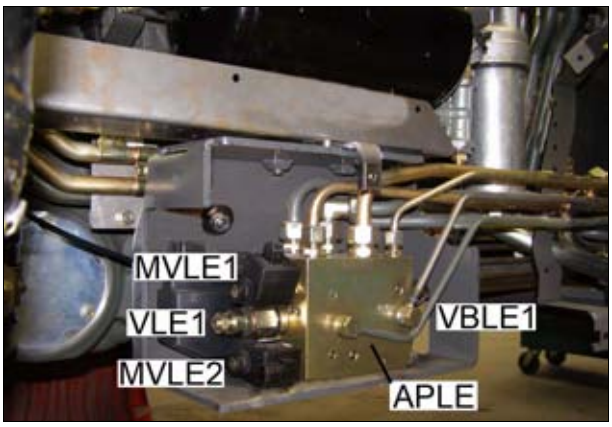


Fig. 360. I001892

DRVLE - Pilot pressure cut-off valve, el.-hyd. steering system

Right side of transmission.

Remove right rear wheel.

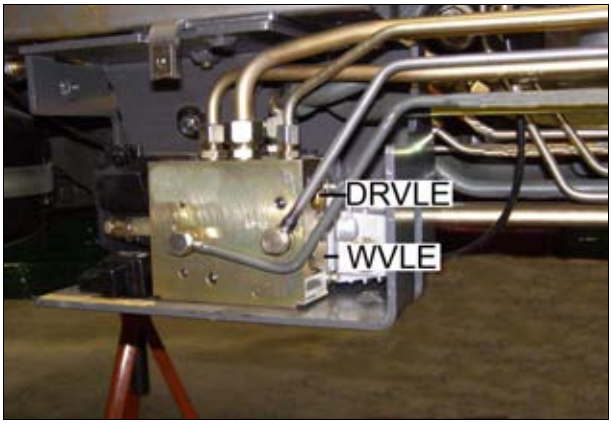


Fig. 361. I001890

MVLE1 [Y085] - Solenoid valve, pilot pressure/switch-off (Auto-Guide)

Right side of transmission.

Remove right rear wheel.

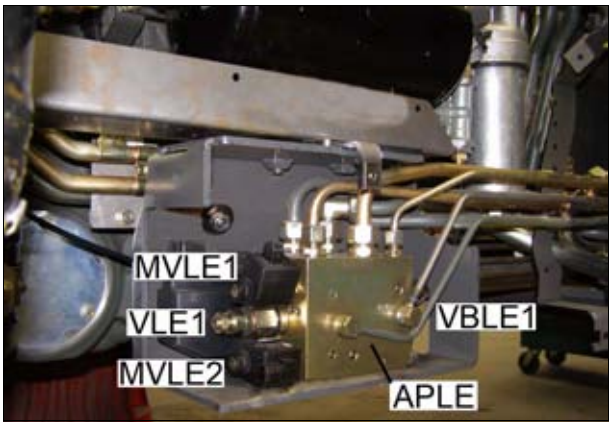


Fig. 362. I001892

MVLE2 [Y086] - Solenoid valve, steering disconnect (Auto-Guide)

Right side of transmission.

Remove right rear wheel.

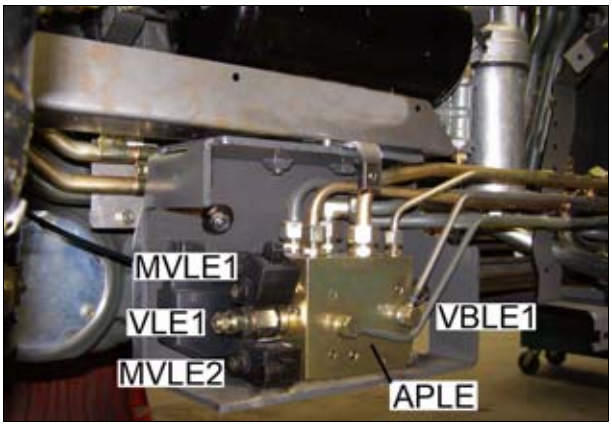
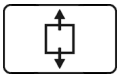


Fig. 363. I001892

PVLE - Proportional valve, el.-hyd. steering system

Right side of transmission.



Remove right rear wheel.

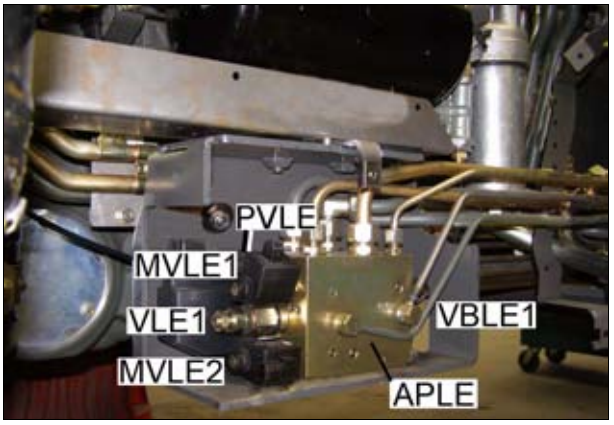
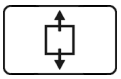


Fig. 364. I003983

VBLE1 - Valve block, el.-hyd. steering system 1

Right side of transmission.



Remove right rear wheel.

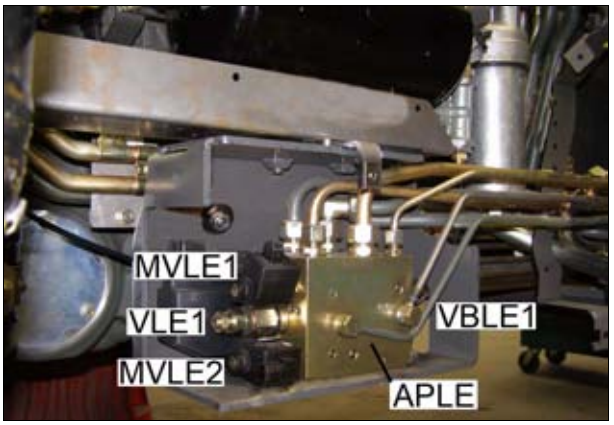
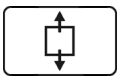


Fig. 365. I001892

VBLE2 - Valve block, el.-hyd. steering system 2

Right side of tractor, behind the right fuel tank.



Remove the right fuel tank.

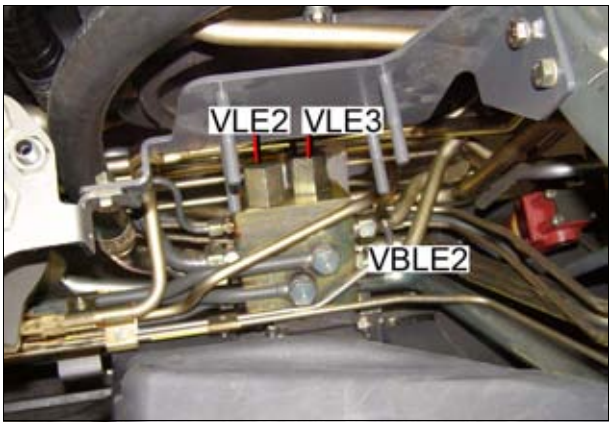
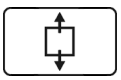


Fig. 366. I001894

VLE1 - LE priority valve (oversteering valve)

Right side of transmission.



Remove right rear wheel.

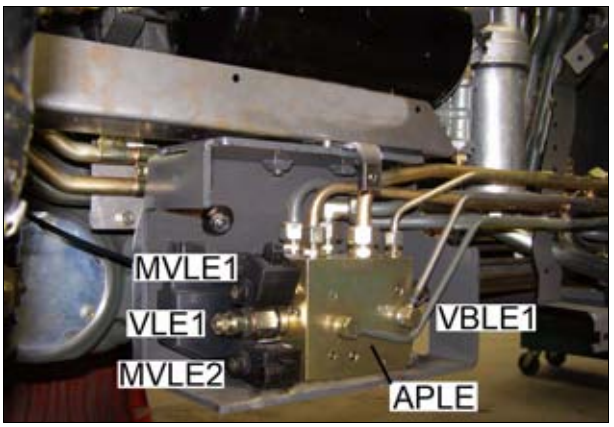
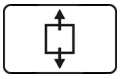


Fig. 367. I001892

VLE2+3 - LE switch off 1 + 2 valves

Right side of tractor, behind the right fuel tank.



Remove the right fuel tank.

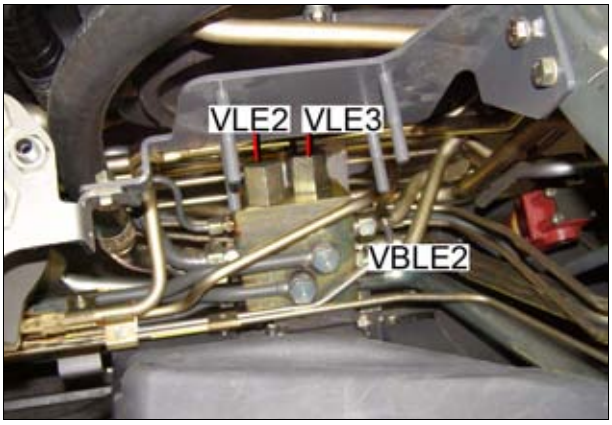
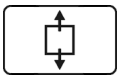


Fig. 368. I001894

WVLE - LS shuttle valve, el.-hyd. steering system

Right side of transmission.



Remove right rear wheel.

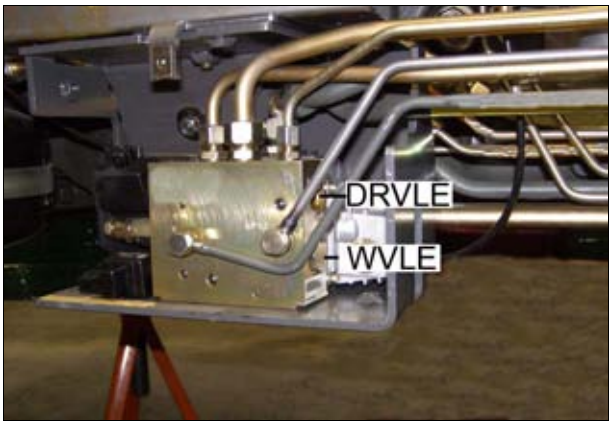


Fig. 369. I001890

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1 General information on calibration

To compensate for mechanical and electrical tolerances in sensors, the sensors concerned must be calibrated.
If a sensor is replaced, it must be calibrated.

The following sensors and functions require calibration

1. Rear EPC calibration (depth control code 8001 and rear power lift position code 8002)
2. Calibration, EPC front (code 9001 and code 9002)
3. Calibration, crossgate lever (hydr. auxiliary valves) (code 1001)
4. Calibration, linear module 1 (hydr. auxiliary control valve) (code 1003)
5. Calibration, linear module 2 (hydr. auxiliary control valve) (code 1004)
6. Calibration, linear module 3 (hydr. auxiliary control valve) (code 1005)
7. Calibration, linear module 4 (hydr.auxiliary control valve) (code 1006)
8. Calibration, front axle suspension (code 7666)
9. Steering calibration (steering angle sensor code 2401/Autoguide control valve code 2403)
10. Calibration, rear PTO coupling time (code 6034)
11. Calibration, front PTO coupling time (code 7034)
12. Calibration, drive clutch pedal (code 4001)
13. Calibration, hand throttle (code 4002)
14. Calibration, travel range selector (code 4003)
15. Calibration, foot throttle pedal (code 4005)
16. Calibration, transmission ratio characteristic (code 4007)
17. Calibration, turbo-clutch function (code 4009)
18. Calibration, throttle pedal resolution (code 4010)
19. Calibration, heater valve (no code)

NOTE: *Observe the calibration sequence.*

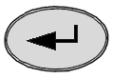
Calibrations 1 to 11 and 19 can be performed in any order.

Calibrations 12 to 18 must be performed in sequence and en block (transmission calibration).
The transmission emergency operation must not be switched on during calibration.
(Transmission oil temperature higher than approx. 40°C during transmission calibration).

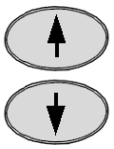
If incorrect values are detected or the conditions are not met, an **ERROR** message appears
If calibration completes successfully, **OK** is displayed, and the new sensor settings are stored.
Data are only accepted when ignition key is turned to position "0".
(Wait for at least 15 seconds before switching on the ignition again!)

Menu levels on the A007 instrument panel

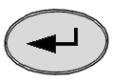
If no error message is present:



Press "Return", the first main menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return", the second main menu appears in the multiple display

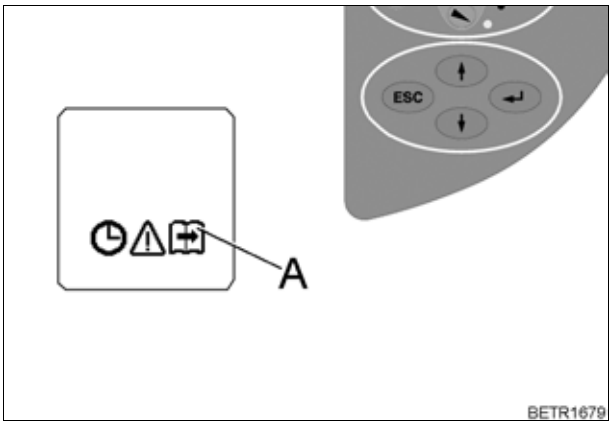


Fig. 1. I000761

Second main menu in the A007 instrument panel

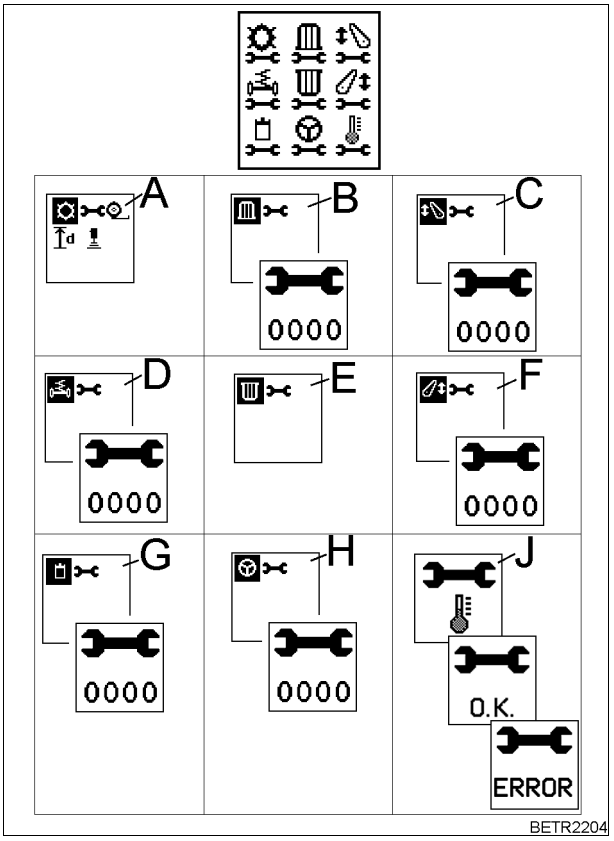


Fig. 2. I001079

Transmission menu

Front PTO menu (for front PTO only)

Front power lift menu (for EPC front power lift only)

Front axle suspension menu

Rear PTO menu

Rear power lift menu

Hydraulics menu

Steering menu

Heater valve menu

Transmission menu

Transmission menu

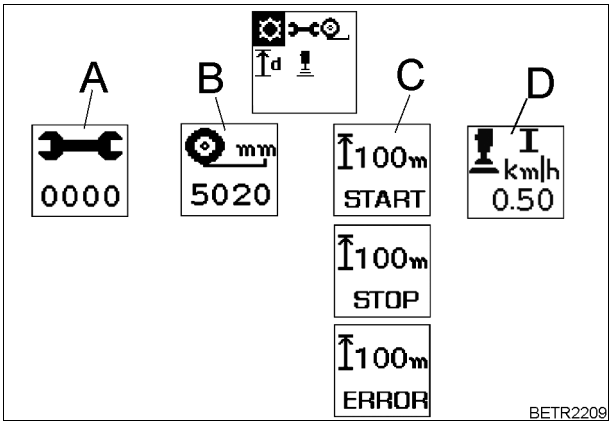


Fig. 3.

Transmission calibration, Display (A)

Change wheel circumference, Display (B)

Calibrate speed display, Display (C)

Change acceleration ramp I, Display (D) (Note: adjustment range from 0.02-0.5 km/h possible)

Rear PTO menu

Rear PTO menu

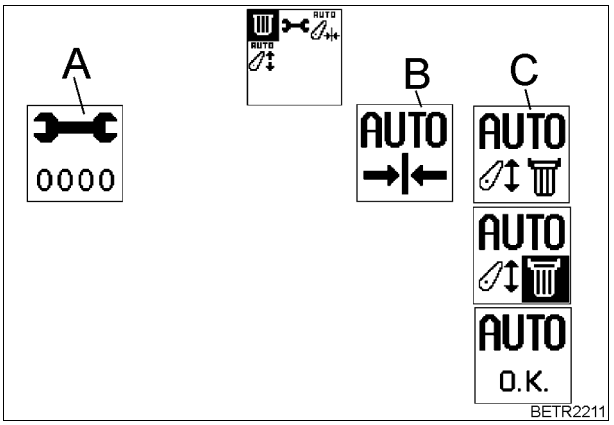


Fig. 4. I001101

Rear PTO calibration, Display (A)

Select factory setting for auto mode switch-on point, Display (B) (see also: Operating Manual)

Change auto mode switch-on point, Display (C) (see also: Operating Manual)

2 Calibration code 8001, 8002 (EPC rear)

1. Calibration of the EPC rear

Calibration of depth control (8001)

Important: The following preparatory steps must be carried out.

– Hand brake applied
– Ignition ON
– If fault messages are displayed, the faults must be confirmed one by one.

Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel

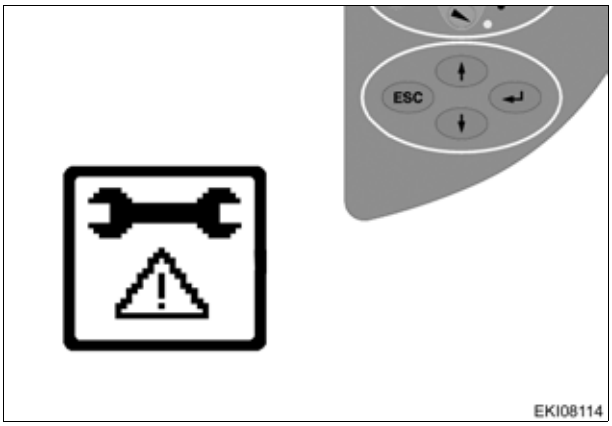
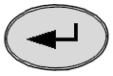
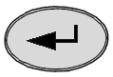


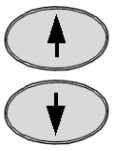
Fig. 5. I000760



Press "Return", the first main menu appears in the multiple display



Press "Return", the second main menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes

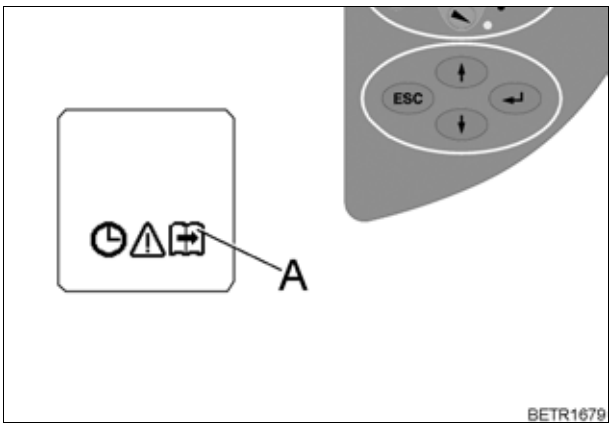
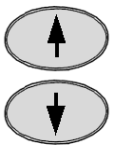
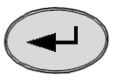


Fig. 6. I000761

The second main menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return" to confirm

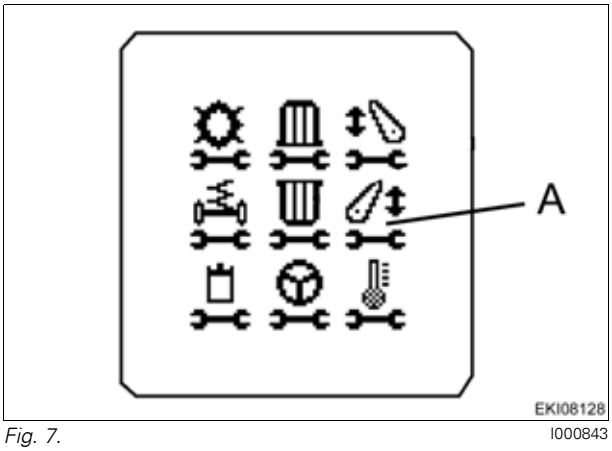
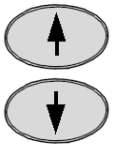
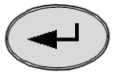


Fig. 7. I000843

The rear power lift menu level appears on the multi-display.



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return" to confirm

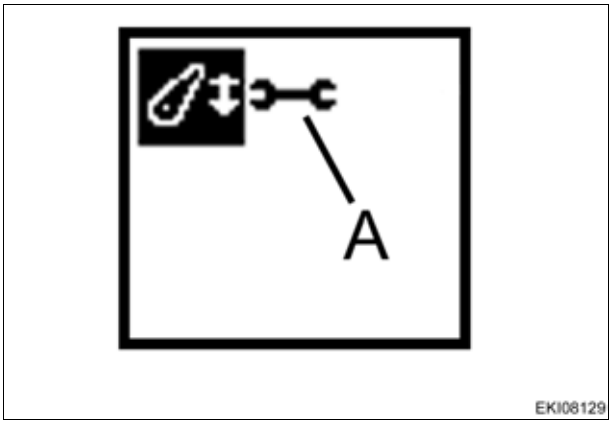
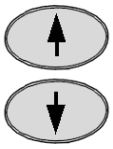


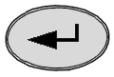
Fig. 8. I000899

Input code **8001**



Press one of the buttons until the required number is displayed

Press "Return" to confirm



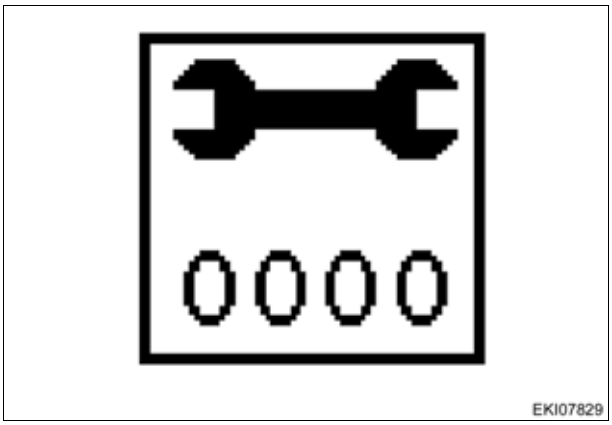
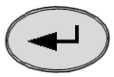


Fig. 9. I000773

Rotate depth control to Pos. 10 (floating position)

Press "Return" to confirm



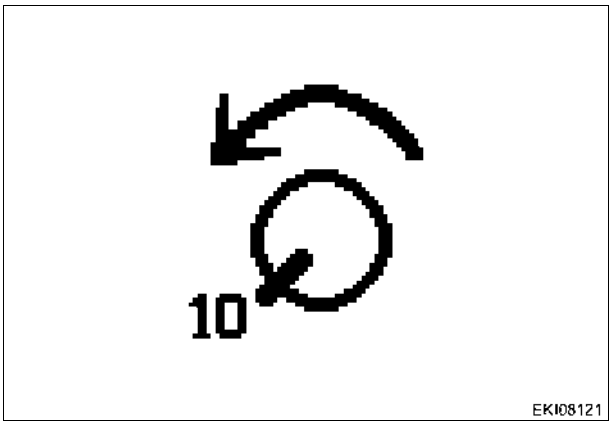


Fig. 10. I000886

Slowly rotate depth control to the right

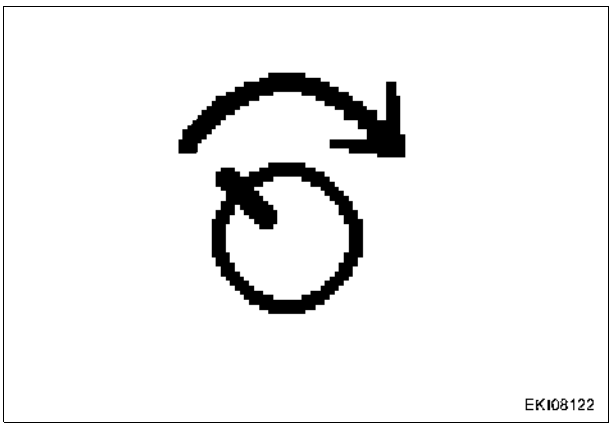


Fig. 11. I000887

Slowly rotate depth control to the right

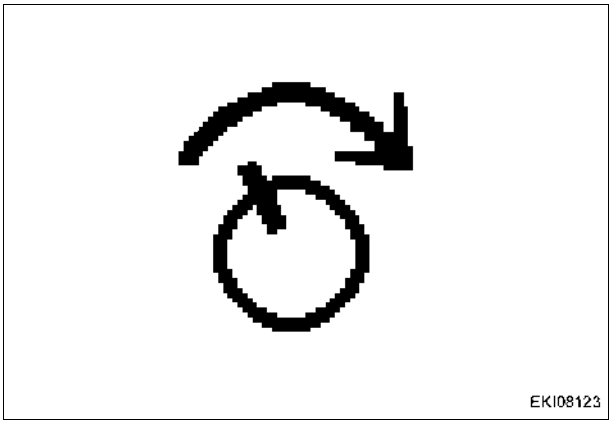


Fig. 12. I000888

Slowly rotate depth control to the right

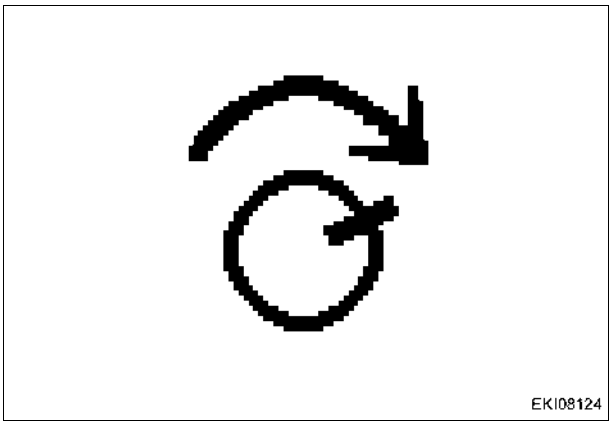


Fig. 13. I000889

NOTE: *If the depth control is rotated too quickly, an image will appear.*
Rotate depth control back slightly

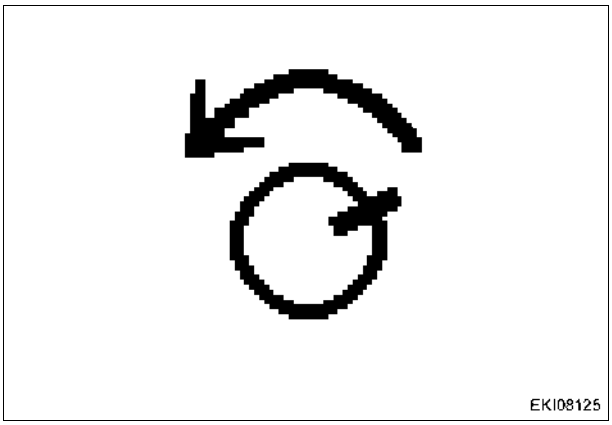
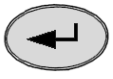


Fig. 14. I000890

Rotate depth control to Pos. 0

Press "Return" to confirm



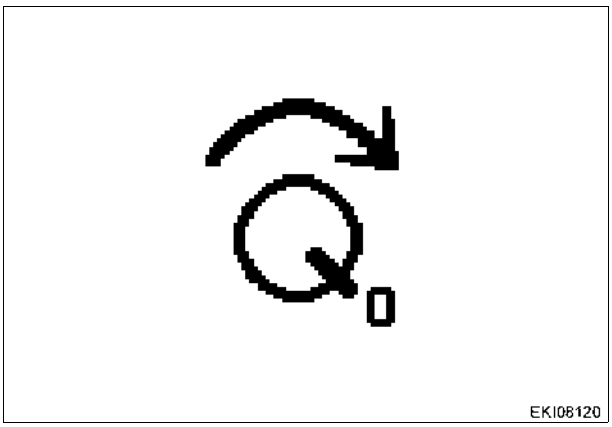


Fig. 15. I000847

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

NOTE: *Settings are only transferred when the ignition key has been turned to "0" position.*
(Wait for at least 15 seconds before switching on the ignition again!)

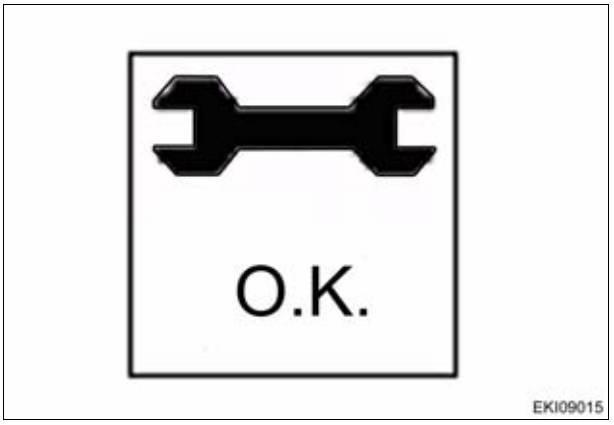


Fig. 16. I003578

If incorrect values are detected or the conditions are not met, an message appears**ERROR**

8001 = calibration code
FXX = error code (see table)

NOTE: *The fault code is displayed from end-of-line program (EOL) 7.60 onward (Autumn 2007)*

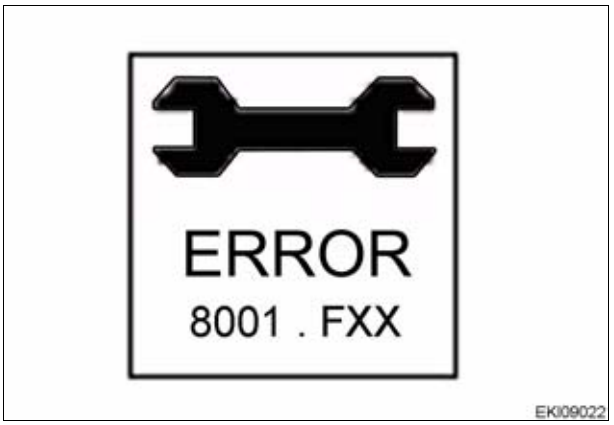


Fig. 17. I003591

Fault code	Cause
F02	Calibrated values are invalid
F03	A039 multifunction armrest failing to report
F08	Calibration taking too long (more than 30 seconds)
F09	User terminated calibration with ESC

Calibration of rear power lift position (code 8002)
Important: The following preparatory steps must be carried out

- Hand brake applied
- Start engine
- If fault messages are displayed, the faults must be confirmed one by one.

Confirm warning and fault messages shown on the A007 instrument panel with the "ESC" button.

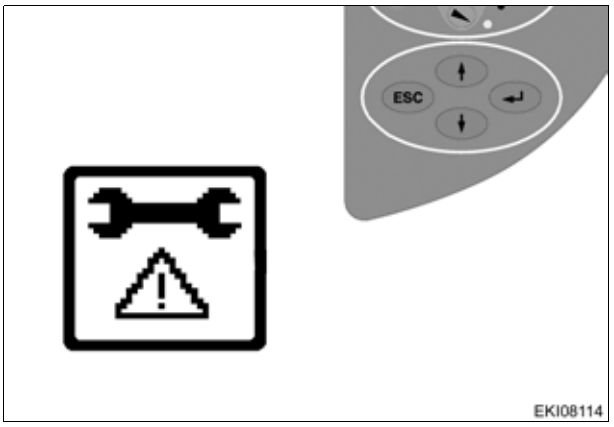


Fig. 18. I000760

Press "Return", the first main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes

Press "Return", the second main menu appears in the multiple display

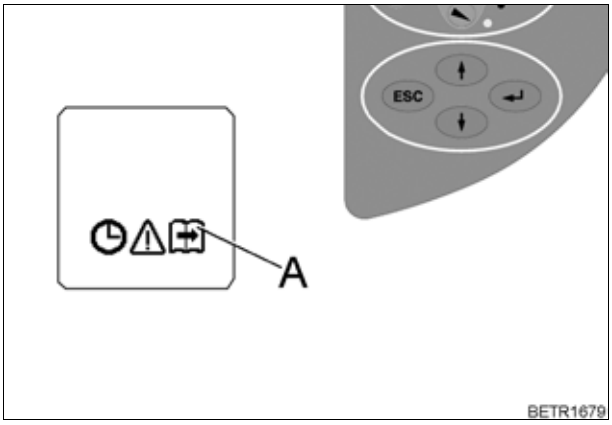


Fig. 19. I000761

The second main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes

Press "Return" to confirm

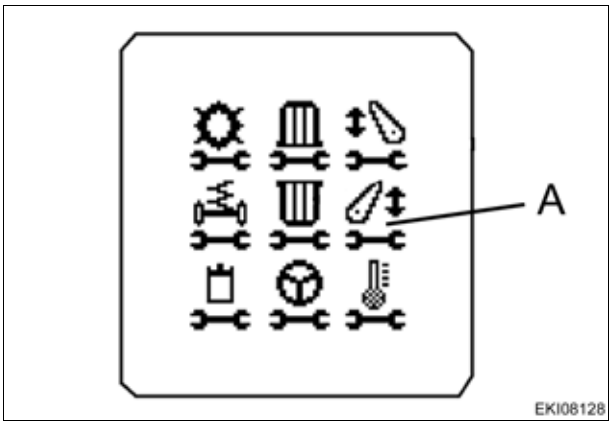


Fig. 20. I000843

The rear power lift menu level appears on the multi-display.

Press one of the buttons repeatedly until the symbol (A) flashes

Press "Return" to confirm

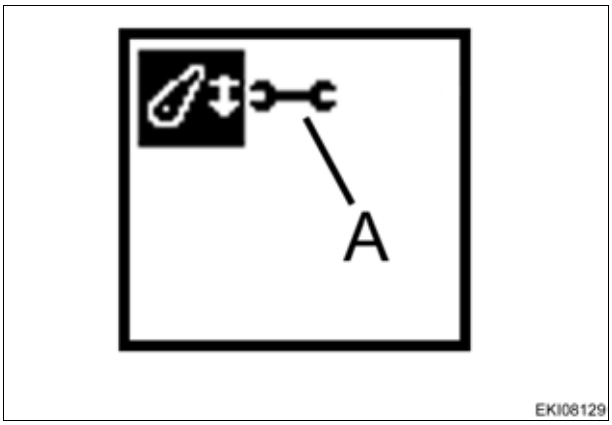


Fig. 21. I000899

Input code **8002**

Press one of the buttons until the required number is displayed

Press "Return" to confirm

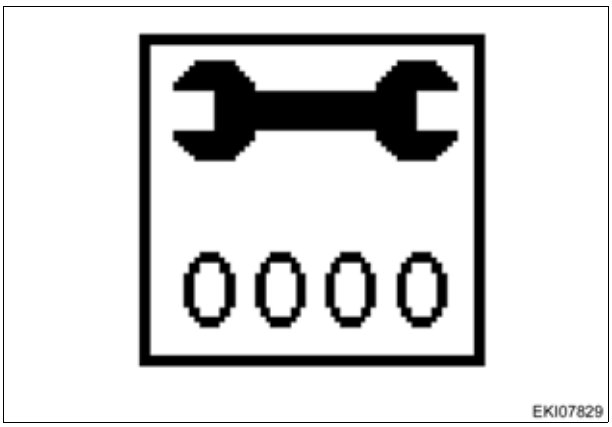
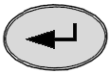


Fig. 22. I000773

Set quick lift switch to "Raise". The lifting gear rises up and remains in its uppermost position

Press "Return" to confirm



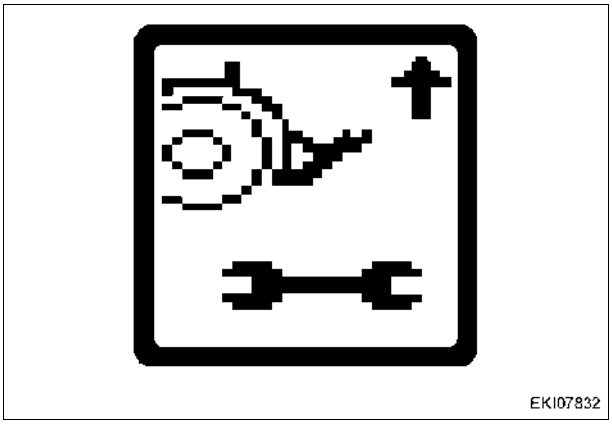
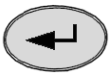


Fig. 23. I000893

Set quick lift switch to "Lower". The linkage lowers and remains in its lowermost position

Press "Return" to confirm



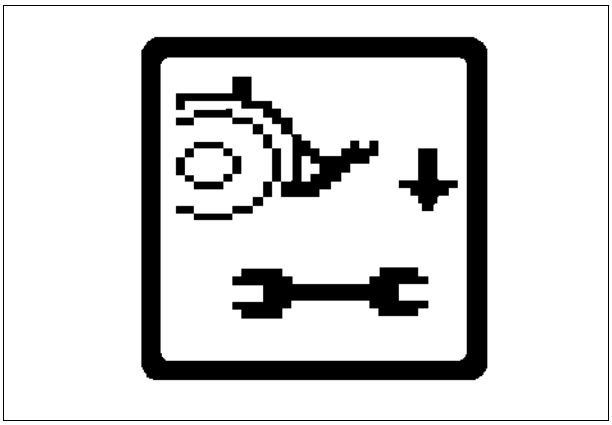


Fig. 24. I000532

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

NOTE: *Settings are only transferred when the ignition key has been turned to "0" position.*
(Wait for at least 15 seconds before switching on the ignition again!)

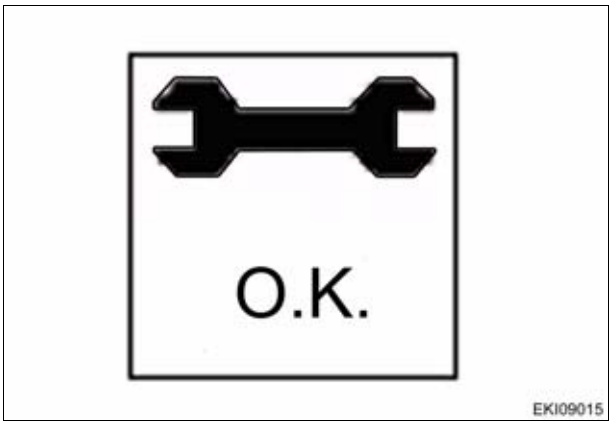


Fig. 25. I003578

If faulty values are found, is displayed**ERROR**
Place ignition key in position "0"
Wait for at least 15 seconds before switching on ignition again!
Carry out calibration again.

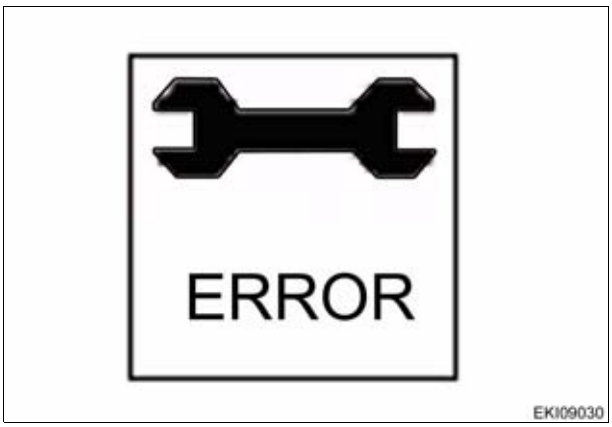


Fig. 26. I003599

3 Calibration code 9001, 9002 (front EPC)

2. Calibrating the front EPC

Calibrating the depth control (9001)

Important: The following preparatory steps must be carried out.

– Hand brake applied
– Ignition ON
– If fault messages are displayed, the faults must be confirmed one by one.

Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel

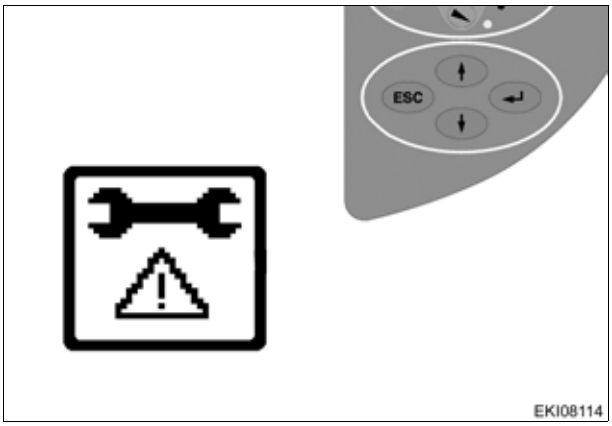
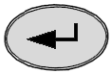
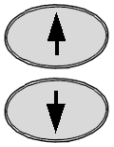


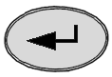
Fig. 27. I000760



Press "Return", the first main menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return", the second main menu appears in the multiple display

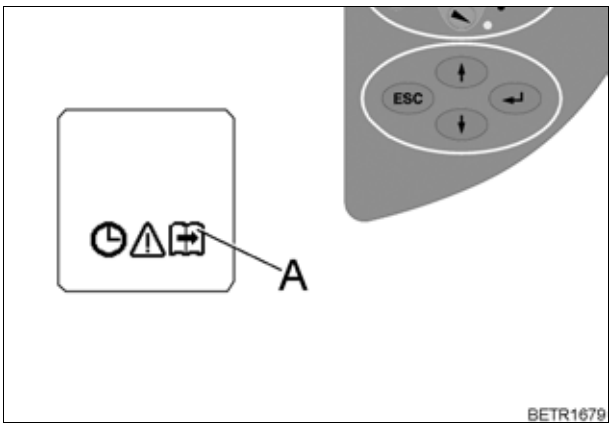
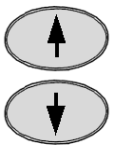
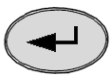


Fig. 28. I000761

The second main menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return" to confirm

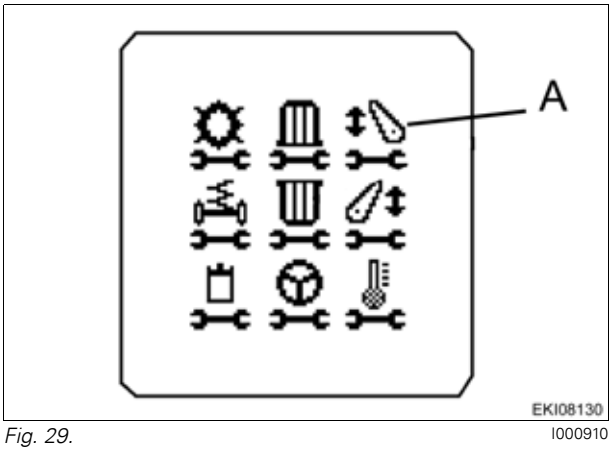
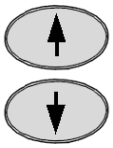


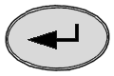
Fig. 29. I000910

The front power lift menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes

Press "Return" to confirm



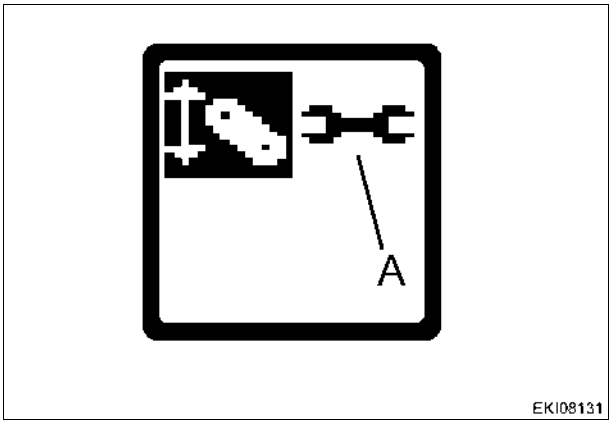
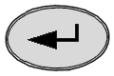


Fig. 30. I000911

Input code **9001**

Press one of the buttons until the required number is displayed

Press "Return" to confirm



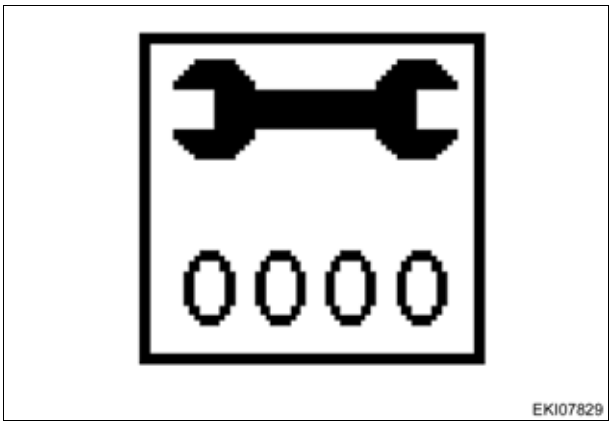
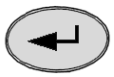


Fig. 31. I000773

Rotate depth control to Pos. 10 (floating position)



Press "Return" to confirm

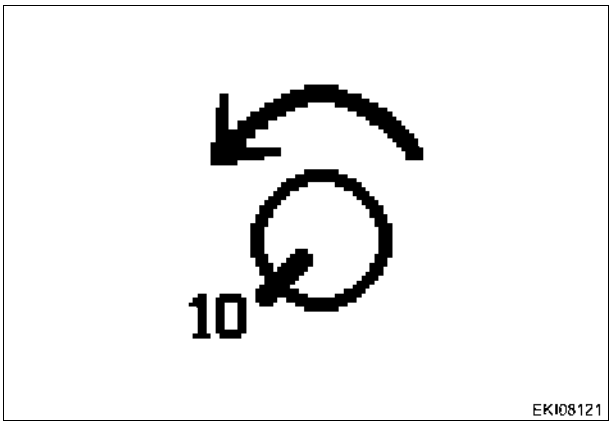


Fig. 32. I000886

Slowly rotate depth control to the right

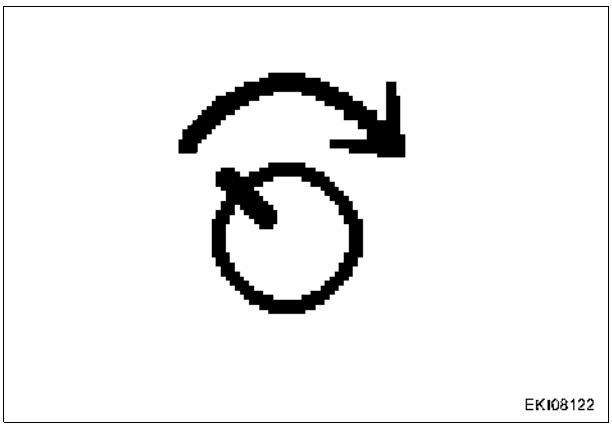


Fig. 33. I000887

Slowly rotate depth control to the right

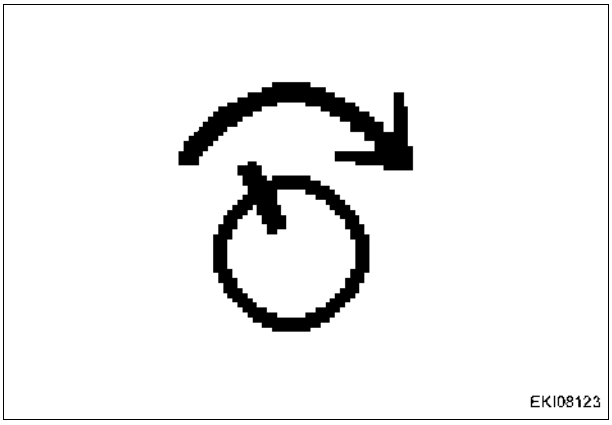


Fig. 34. I000888

Slowly rotate depth control to the right

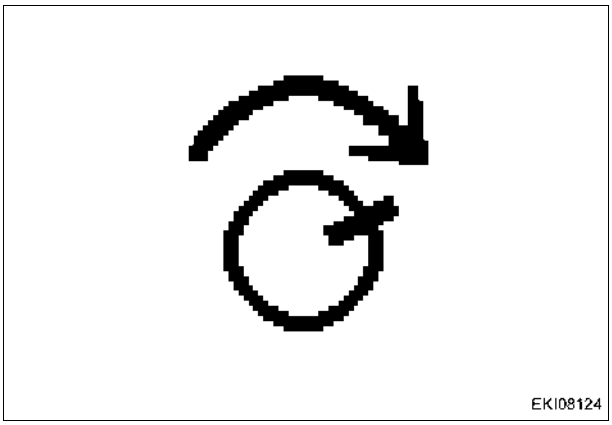


Fig. 35. I000889

NOTE: *If the depth control is rotated too quickly, an image will appear.*
Rotate depth control back slightly

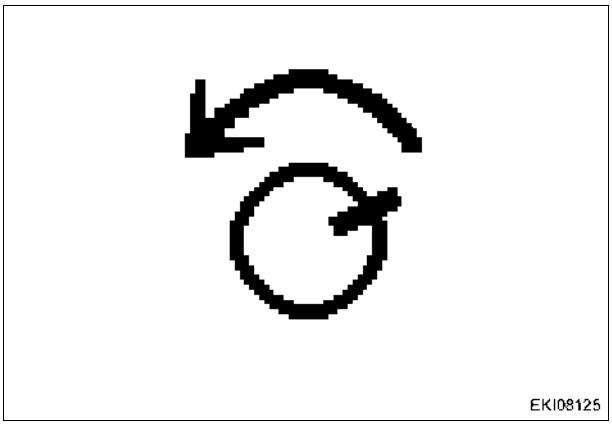
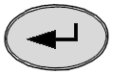


Fig. 36. I000890

Rotate depth control to Pos. 0

Press "Return" to confirm



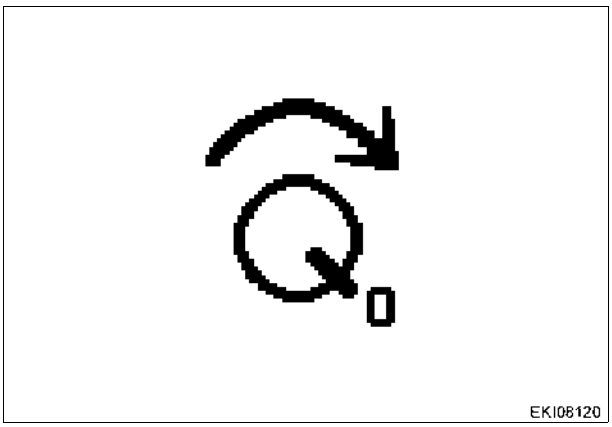


Fig. 37. I000847

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

NOTE: *Settings are only transferred when the ignition key has been turned to "0" position.*
(Wait for at least 15 seconds before switching on the ignition again!)

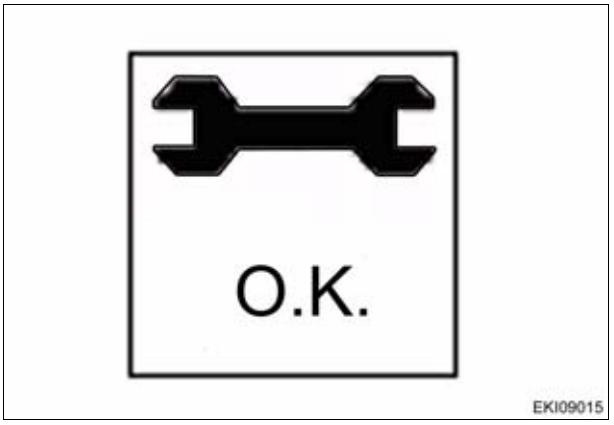


Fig. 38. I003578

If incorrect values are detected or the conditions are not met, an message appears**ERROR**

9001 = calibration code
FXX = error code (see table)

NOTE: *The fault code is displayed from end-of-line program (EOL) 7.60 onward (as of autumn 2007)*

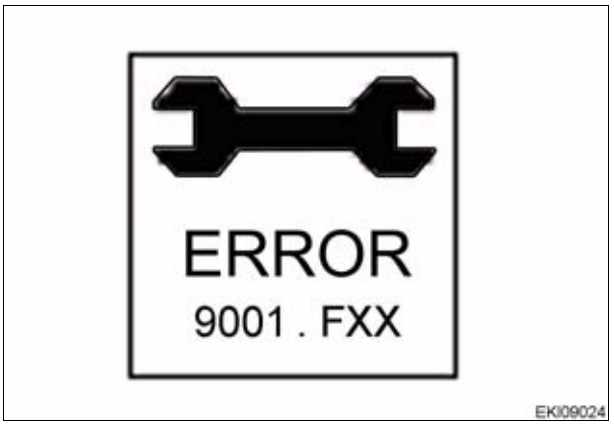


Fig. 39. I003593

Fault code	Cause
F02	Calibrated values are invalid
F03	A039 multifunction armrest failing to report
F08	Calibration taking too long (more than 30 seconds)
F09	User terminated calibration with ESC

Calibrating the front power lift position (code 9002)
Important: The following preparatory steps must be carried out

- Hand brake applied
- Start engine
- If fault messages are displayed, the faults must be confirmed one by one.

Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel

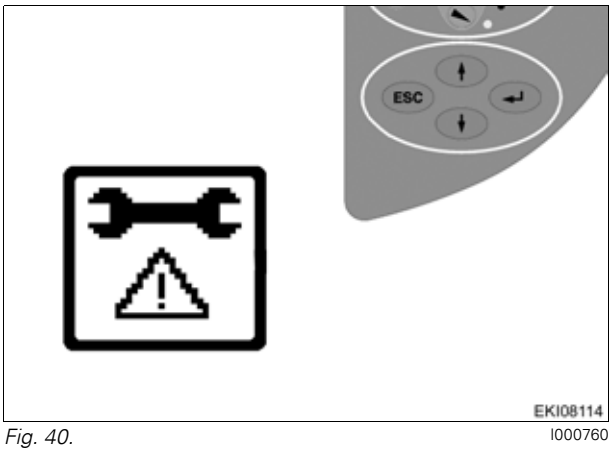


Fig. 40. I000760

Press "Return", the first main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes

Press "Return", the second main menu appears in the multiple display

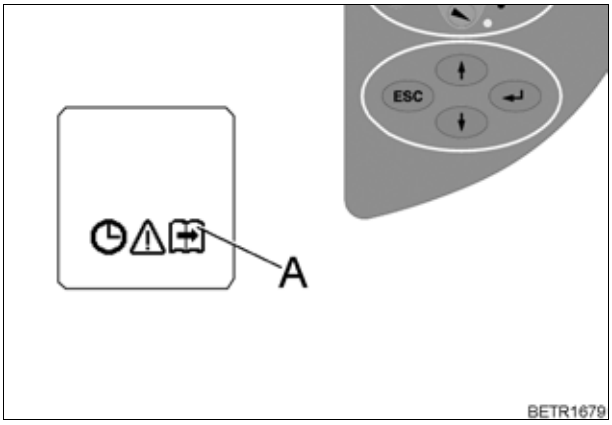


Fig. 41. I000761

The second main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes

Press "Return" to confirm

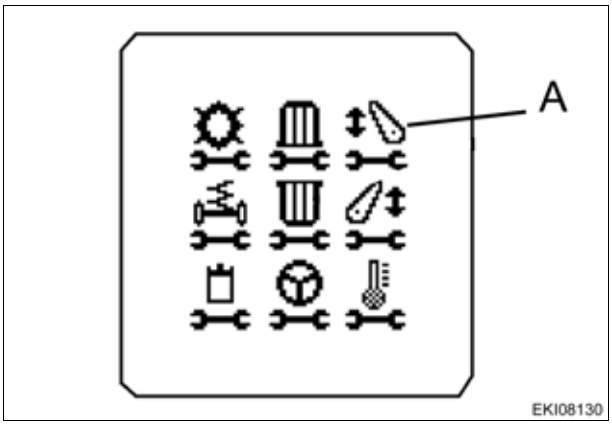


Fig. 42. I000910

The front power lift menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes

Press "Return" to confirm

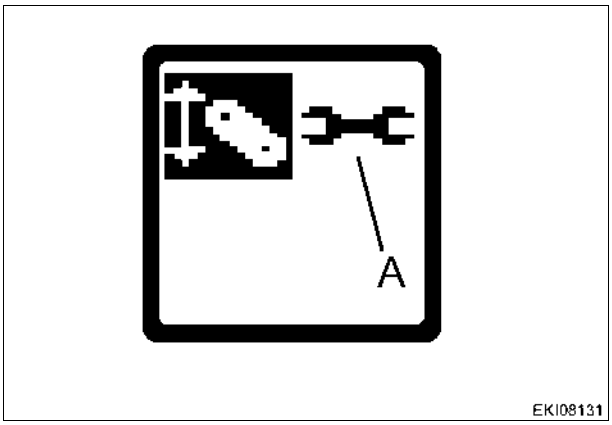


Fig. 43. I000911

Input code **9002**

Press one of the buttons until the required number is displayed

Press "Return" to confirm

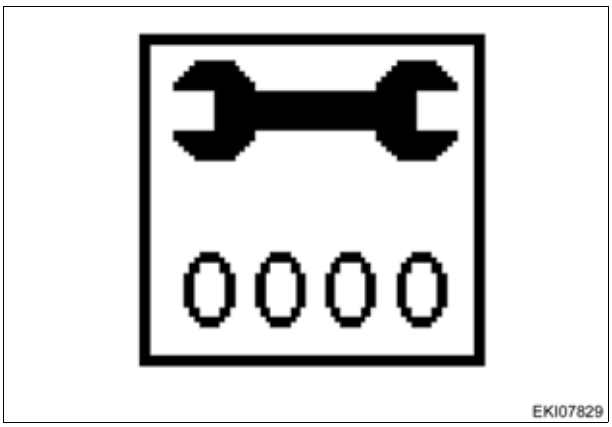
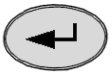


Fig. 44. I000773

Set quick lift switch to "Raise". Front power lift will raise and stop at the top

Press "Return" to confirm



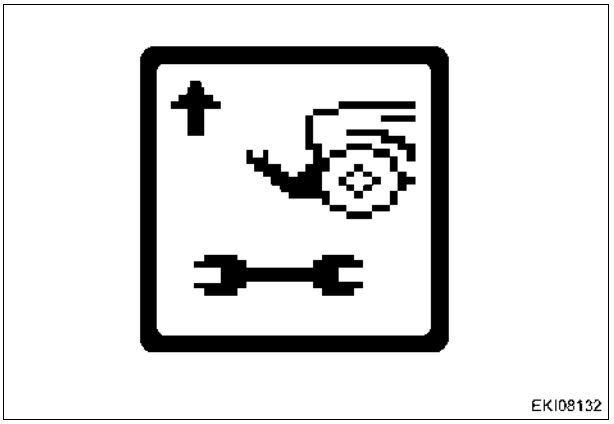
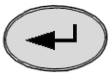


Fig. 45. I000918

Set quick lift switch to "Lower". Front power lift will lower and stop at the bottom

Press "Return" to confirm



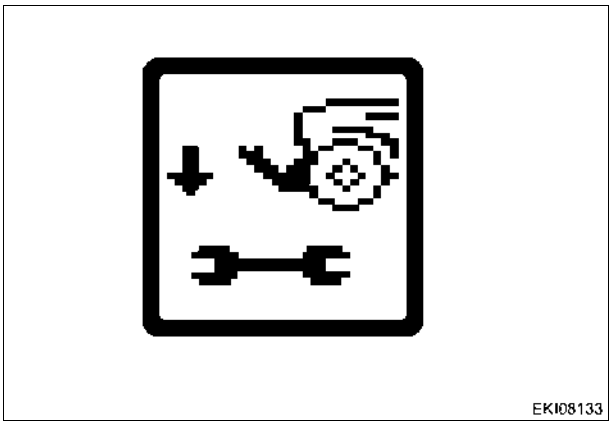


Fig. 46. I000919

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

NOTE: *Settings are only transferred when the ignition key has been turned to "0" position.*
(Wait for at least 15 seconds before switching on the ignition again!)

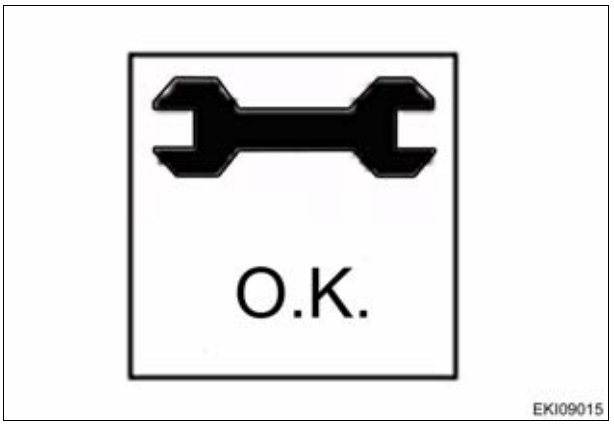


Fig. 47. I003578

If faulty values are found, is displayed**ERROR**
Place ignition key in position "0"
Wait for at least 15 seconds before switching on ignition again!
Carry out calibration again.

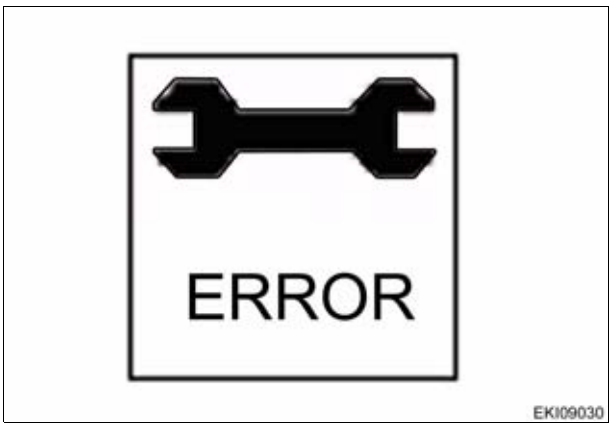


Fig. 48. I003599

4 Calibration code 1001 (crossgate lever)

3. Calibrating the crossgate lever (1001)

Important: The following preparatory steps must be carried out.

– Hand brake applied
– Ignition ON
– If fault messages are displayed, the faults must be confirmed one by one.

Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel

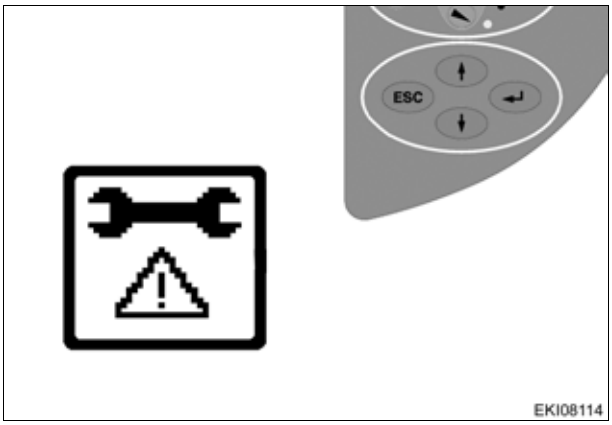
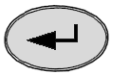


Fig. 49. I000760



Press "Return", the first main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes

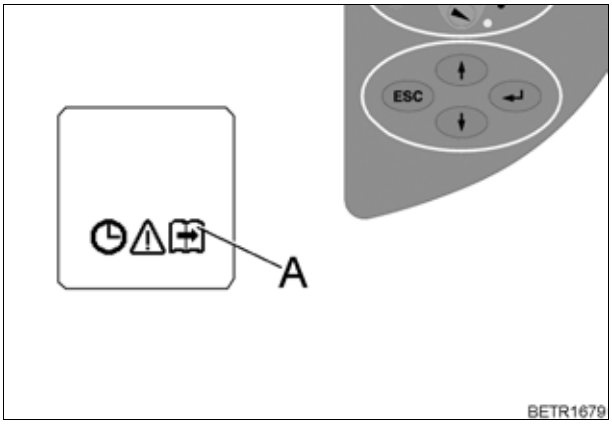
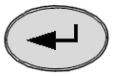


Fig. 50. I000761



Press "Return", the second main menu appears in the multiple display

The second main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes

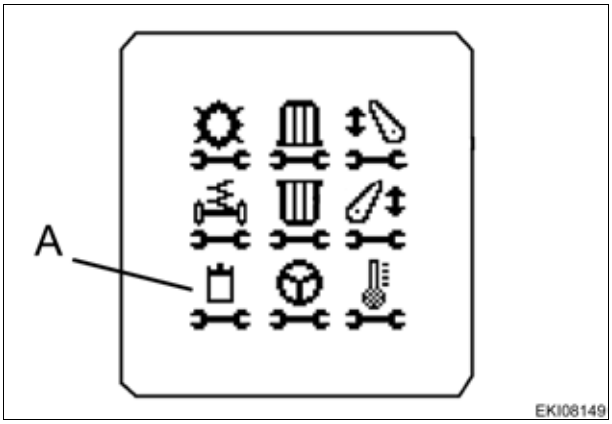
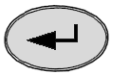
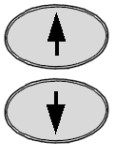


Fig. 51. I000935

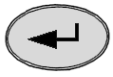


Press "Return" to confirm

The auxiliary control valve menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return" to confirm

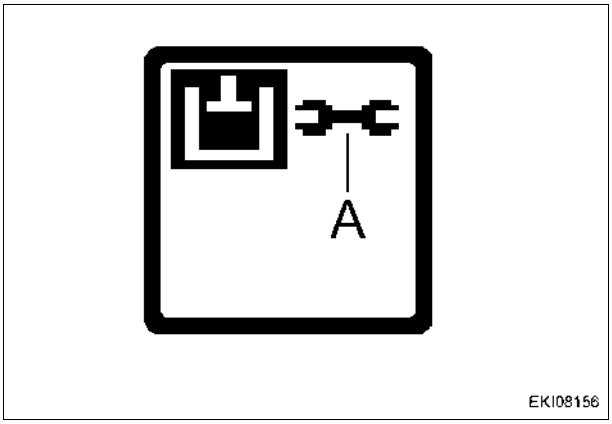
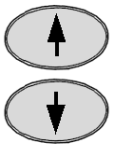


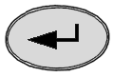
Fig. 52. I000939

Input code **1001**



Press one of the buttons until the required number is displayed

Press "Return" to confirm



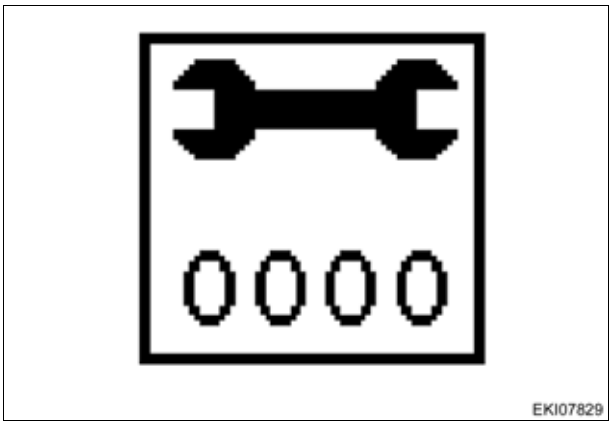
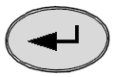


Fig. 53. I000773

Release crossgate lever (centres automatically)

Press "Return" to confirm this position



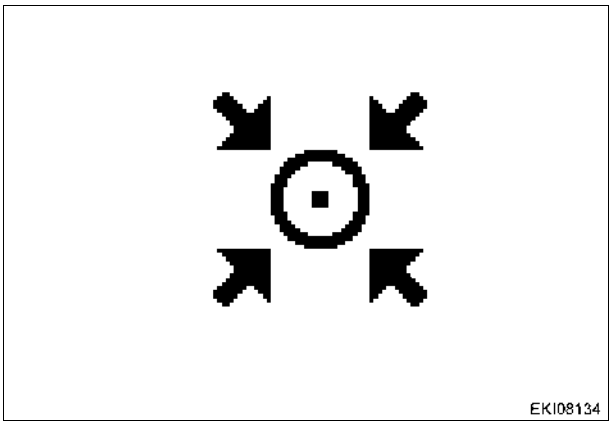
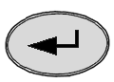


Fig. 54. I000941

Push crossgate lever to right and exert excessive pressure against spring
Hold crossgate lever

Press "Return" to confirm this position



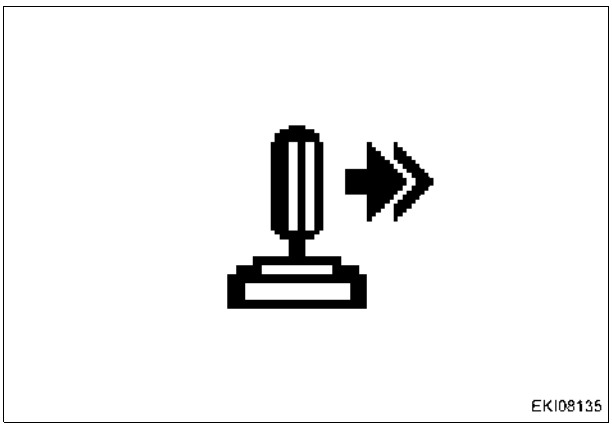
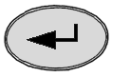


Fig. 55. I000942

Push crossgate lever to left (exert excessive pressure against spring)
Hold crossgate lever

Press "Return" to confirm this position



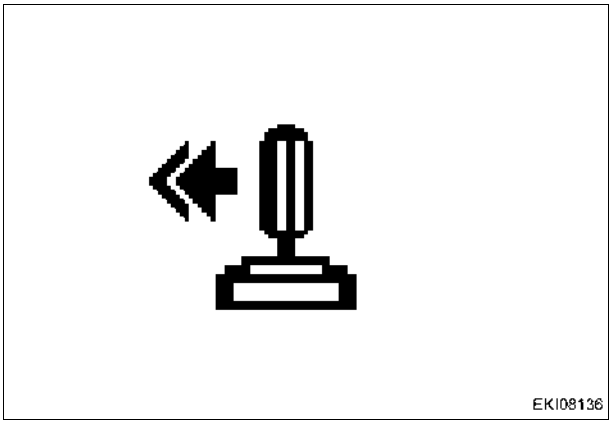
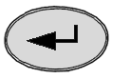


Fig. 56. I000943

Push crossgate lever forward (exert excessive pressure against spring)
Hold crossgate lever

Press "Return" to confirm this position



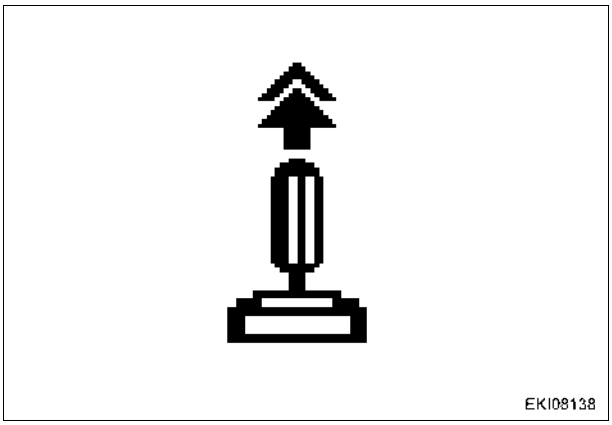
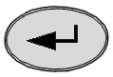


Fig. 57. I000944

Pull crossgate lever backwards (exert excessive pressure against spring)
Hold crossgate lever

Press "Return" to confirm this position



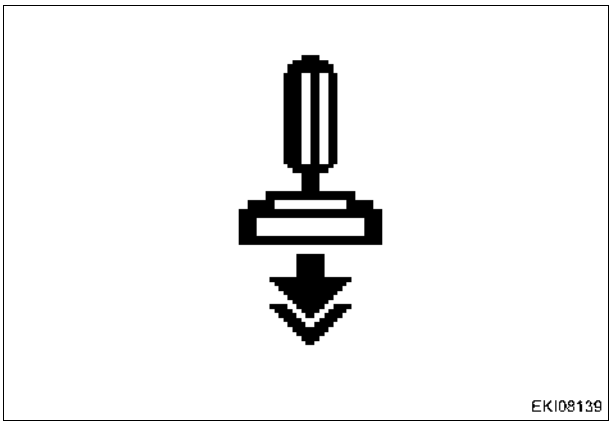
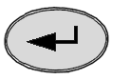


Fig. 58. I000945

Push crossgate lever at front right into the corner (exert excessive pressure against spring)
Hold crossgate lever

Press "Return" to confirm this position



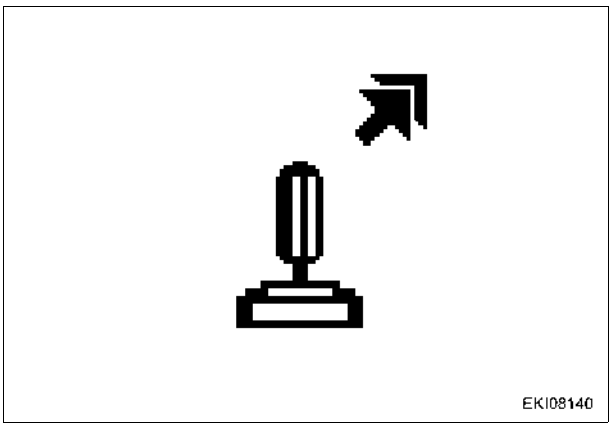
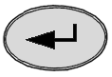


Fig. 59. I000946

Push crossgate lever at rear right into the corner (exert excessive pressure against spring)
Hold crossgate lever

Press "Return" to confirm this position



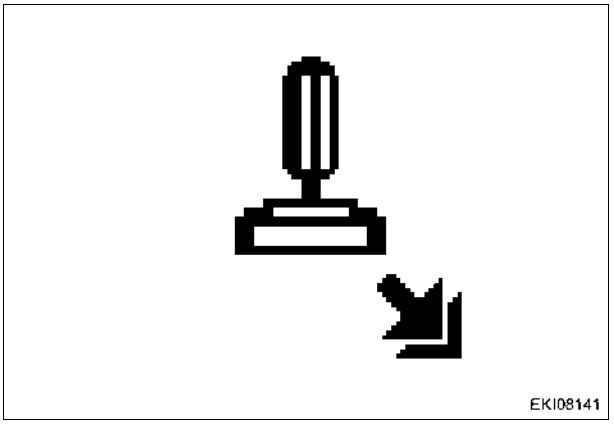
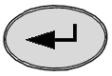


Fig. 60. I000947

Push crossgate lever at rear left into the corner (exert excessive pressure against spring)
Hold crossgate lever

Press "Return" to confirm this position



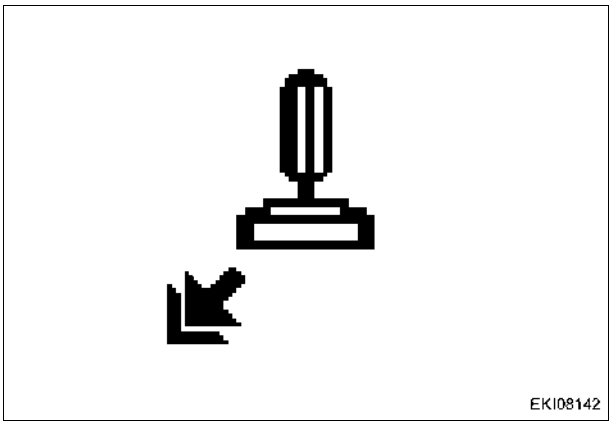
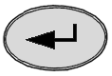


Fig. 61. I000948

Push crossgate lever at front left into the corner (exert excessive pressure against spring)
Hold crossgate lever

Press "Return" to confirm this position



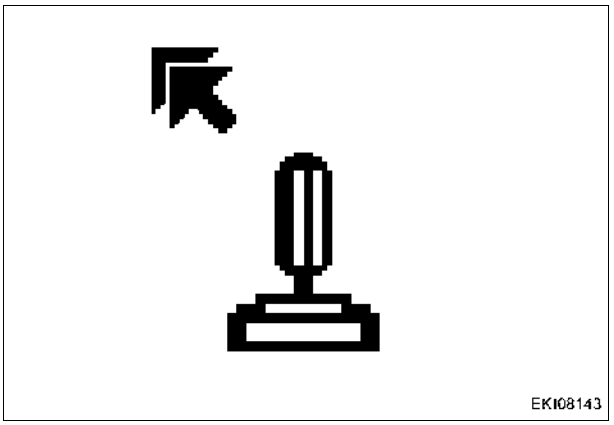
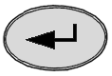


Fig. 62. I000949

Push crossgate lever to right (do not exert excessive pressure against spring)
Hold crossgate lever

Press "Return" to confirm this position



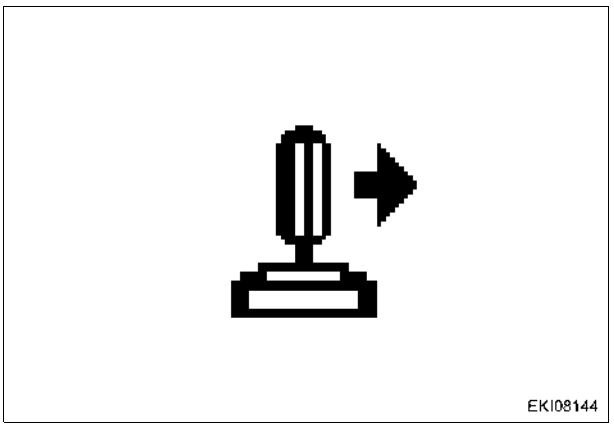
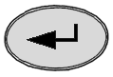


Fig. 63. I000950

Push crossgate lever to left (do not exert excessive pressure against spring
Hold crossgate lever

Press "Return" to confirm this position



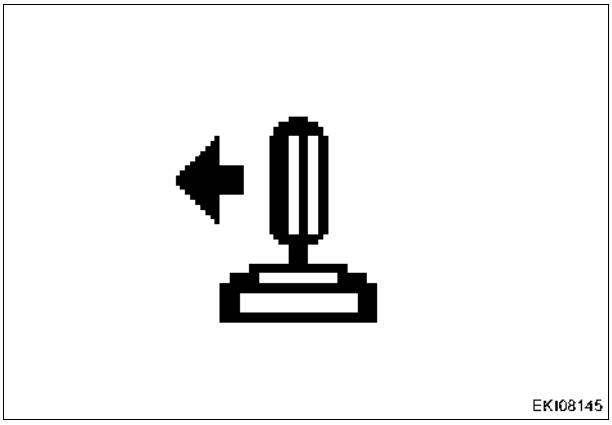
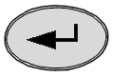


Fig. 64. I000951

Push crossgate lever forwards (do not exert excessive pressure against spring)
Hold crossgate lever

Press "Return" to confirm this position



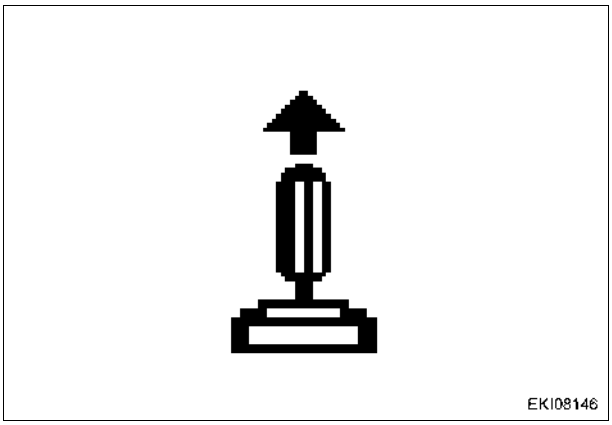
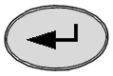


Fig. 65. I000952

Pull crossgate lever backwards (do not exert excessive pressure against spring)
Hold crossgate lever

Press "Return" to confirm this position



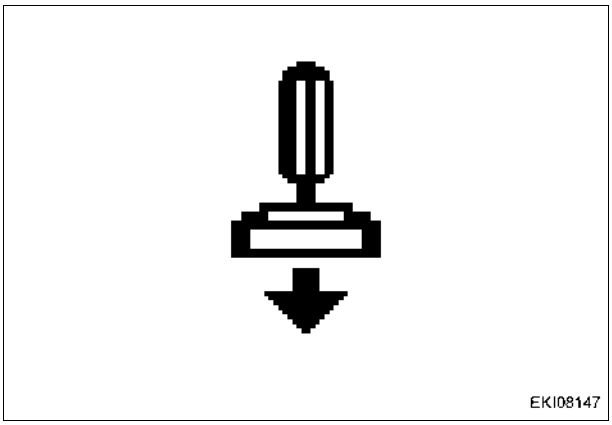


Fig. 66. I000953

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

NOTE: *Settings are only transferred when the ignition key has been turned to "0" position.*
(Wait for at least 15 seconds before switching on the ignition again!)

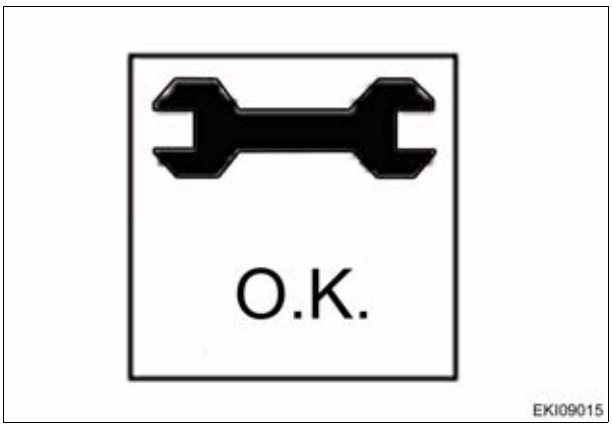


Fig. 67. I003578

If incorrect values are detected or the conditions are not met, an message appears**ERROR**

1001 = calibration code
FXX = fault code

NOTE: *The fault code is displayed from end-of-line program (EOL) 7.60 onward (Autumn 2007)*

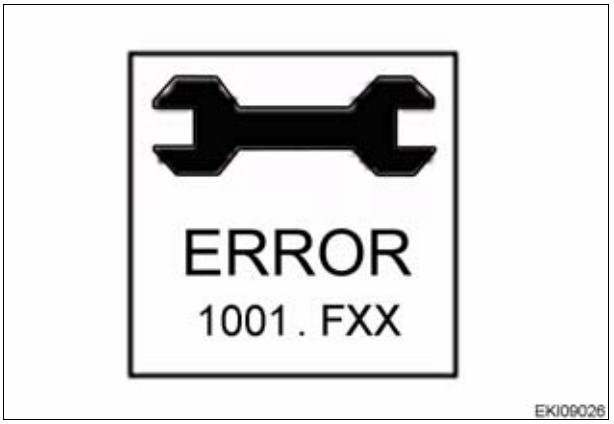


Fig. 68. I003595

Fault code	Cause
F02	Calibrated values are invalid
F03	A039 multifunction armrest failing to report
F08	Calibration taking too long (more than 30 seconds)
F09	User terminated calibration with ESC

5 Calibration code (1003 ... 1006) (linear module)

4. – 7. Calibrating linear module (1003 ... 1006)

Important: The following preparatory steps must be carried out.

– Hand brake applied

– Ignition ON

– If fault messages are displayed, the faults must be confirmed one by one.

Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel

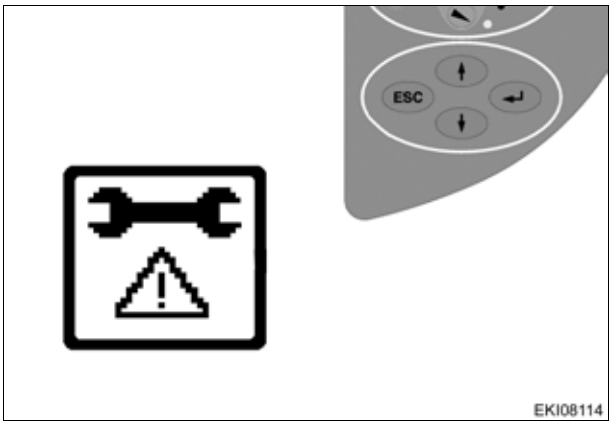
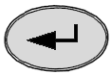
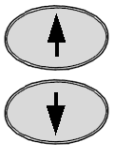


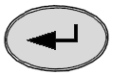
Fig. 69. I000760



Press "Return", the first main menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return", the second main menu appears in the multiple display

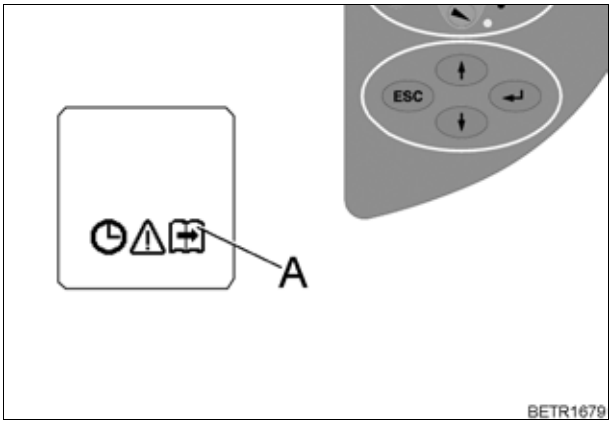
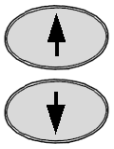
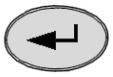


Fig. 70. I000761

The second main menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return" to confirm

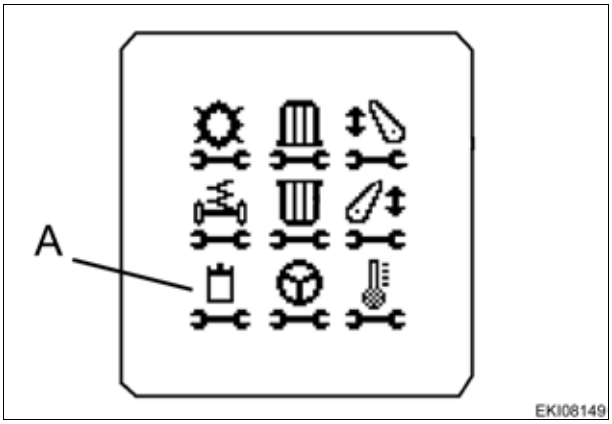
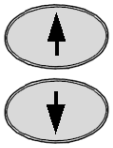
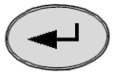


Fig. 71. I000935

The auxiliary control valve menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return" to confirm

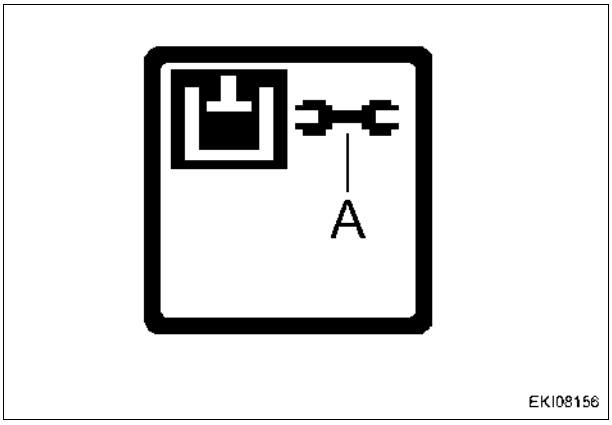
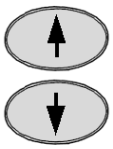


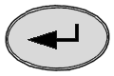
Fig. 72. I000939

Linear module 1 = **code 1003**
Linear module 2 = **code 1004**
Linear module 3 = **code 1005**
Linear module 4 = **code 1006**



Press one of the buttons until the required number is displayed

Press "Return" to confirm



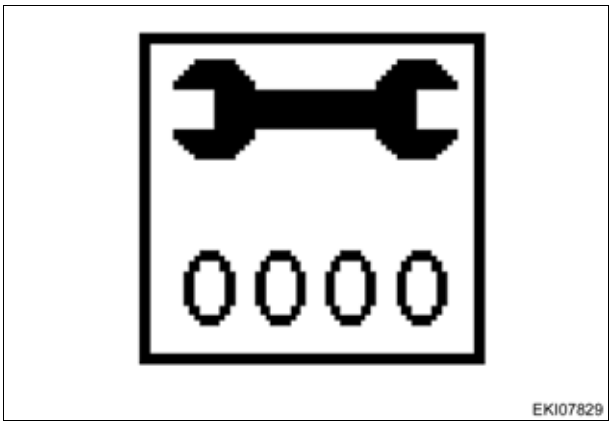
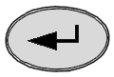


Fig. 73. I000773

Push linear module forward (exert excessive pressure against spring)
Hold linear module

Press "Return" to confirm



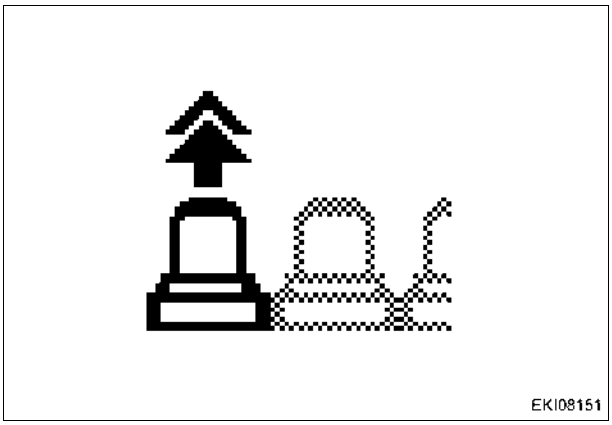
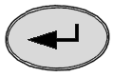


Fig. 74. I000964

Pull linear module backwards (exert excessive pressure against spring)
Hold linear module

Press "Return" to confirm



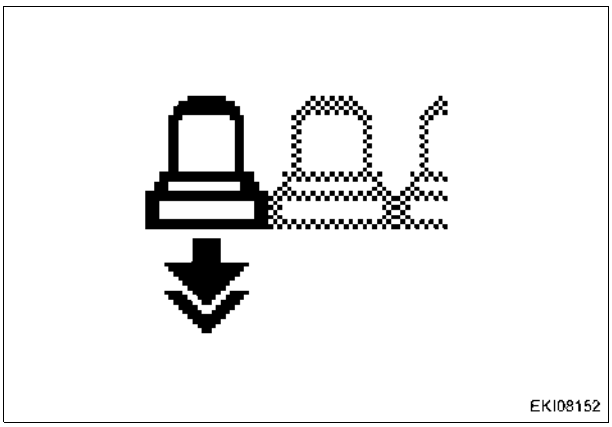
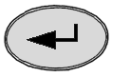


Fig. 75. I000965

Release linear module (centres automatically)

Press "Return" to confirm this position



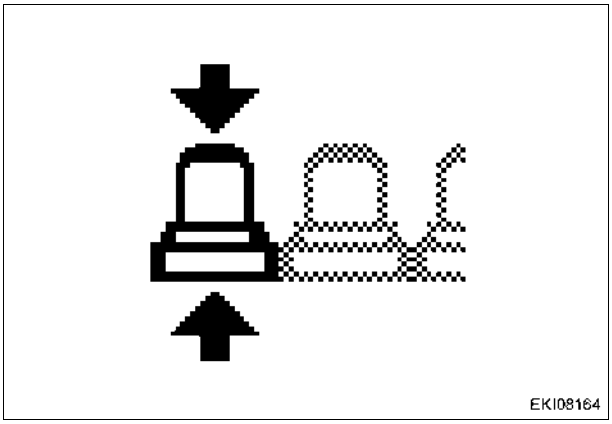
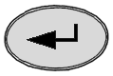


Fig. 76. I000970

Push linear module forwards (do not exert excessive pressure against spring)
Hold linear module

Press "Return" to confirm



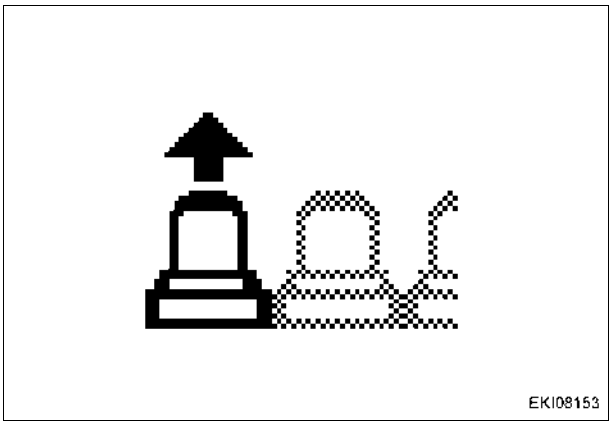
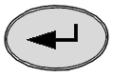


Fig. 77. I000966

Pull linear module backwards (do not exert excessive pressure against spring)
Hold linear module

Press "Return" to confirm



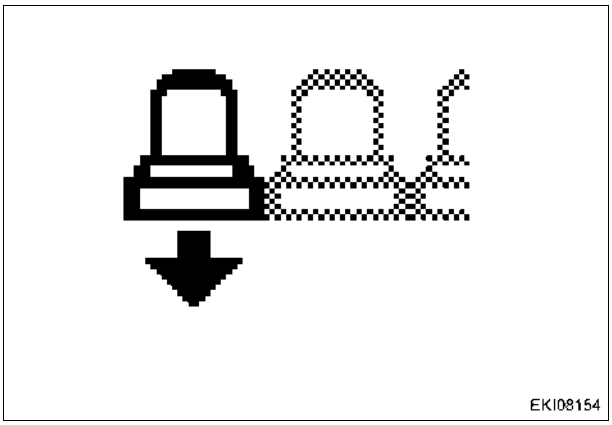


Fig. 78. I000967

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

NOTE: *Settings are only transferred when the ignition key has been turned to "0" position.*
(Wait for at least 15 seconds before switching on the ignition again!)

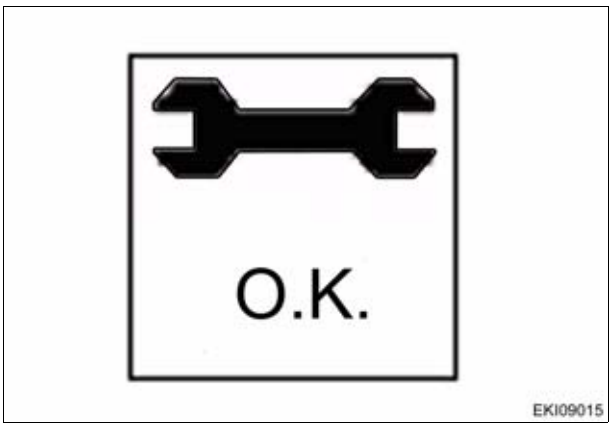


Fig. 79. I003578

If incorrect values are detected or the conditions are not met, an message appears**ERROR**

1003 = calibration code, linear module 1
1004 = calibration code, linear module 2
1005 = calibration code, linear module 3
1006 = calibration code, linear module 4

FXX = fault code

NOTE: *The fault code is displayed from end-of-line program (EOL) 7.60 onward (Autumn 2007)*

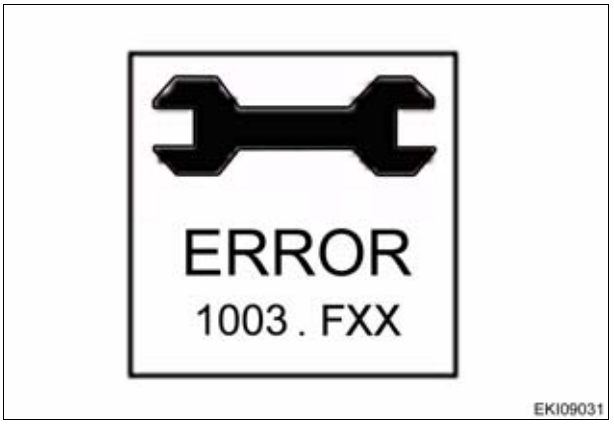


Fig. 80. I003600

Fault code	Cause
F02	Calibrated values are invalid
F03	A039 multifunction armrest failing to report
F08	Calibration taking too long (more than 30 seconds)
F09	User terminated calibration with ESC

6 Calibration code 7666 (front axle suspension)

8. Calibrating the front axle suspension (7666)

WARNING: Calibration operation:

Once the input code has been confirmed, the tractor will raise and lower automatically!

Important: The following preparatory steps must be carried out.

– Position the tractor on a flat, level surface
– Hand brake applied
– Start engine
– If fault messages are displayed, the faults must be confirmed one by one.

Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel

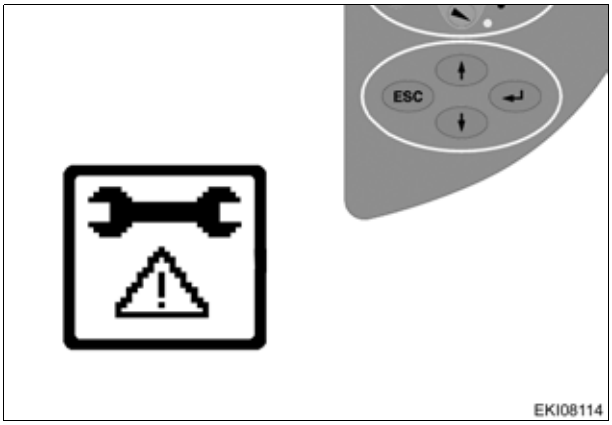
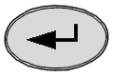
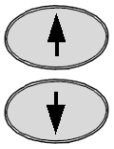


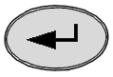
Fig. 81. I000760



Press "Return", the first main menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return", the second main menu appears in the multiple display

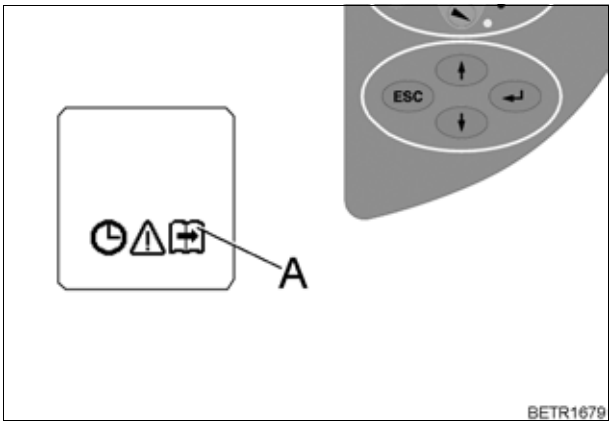
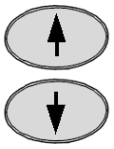
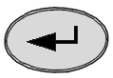


Fig. 82. I000761

The second main menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return" to confirm

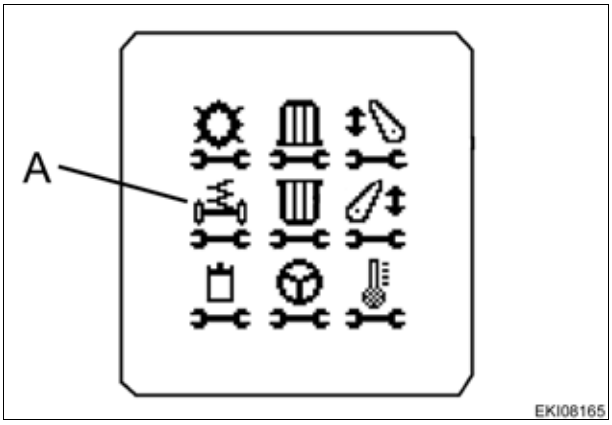
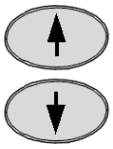
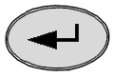


Fig. 83. I000976



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return" to confirm

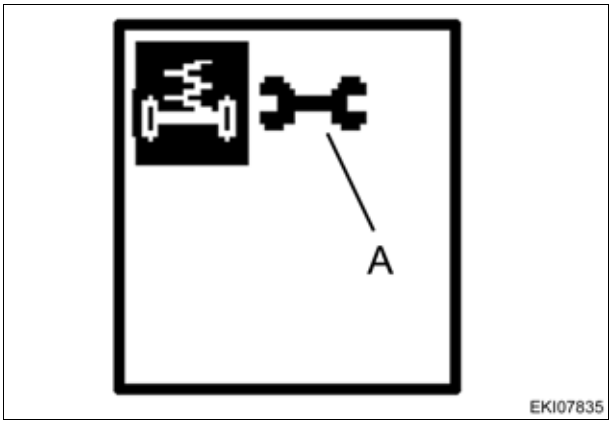
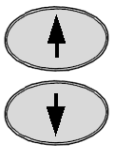


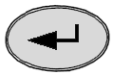
Fig. 84. I000977

WARNING: Once the input code has been confirmed, the tractor will raise and lower automatically!

Input code **7666**



Press one of the buttons until the required number is displayed



Press "Return" to confirm

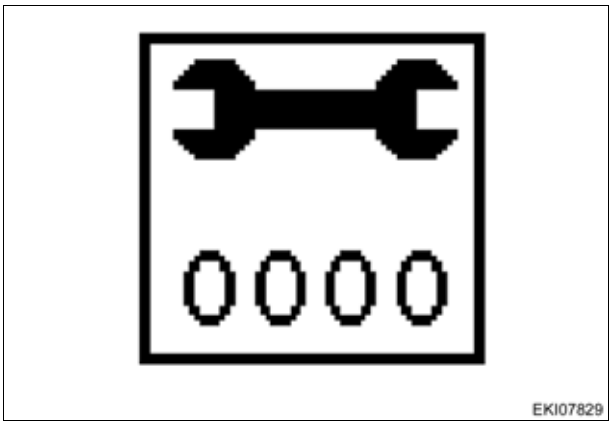
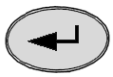


Fig. 85. I000773

The flashing arrow indicates the desired limit position
The tractor is raised to the upper limit position



Press "Return" to confirm the upper limit position

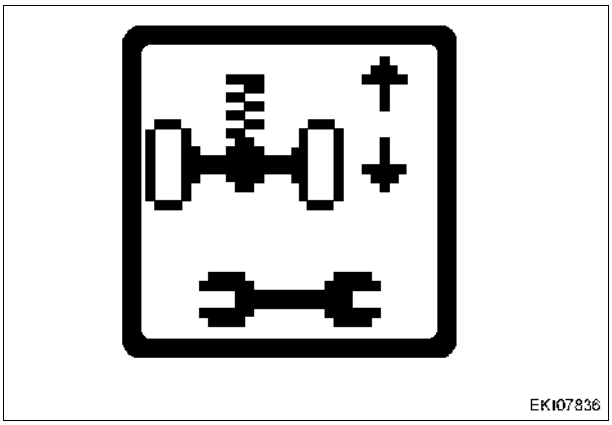
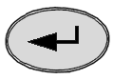


Fig. 86. I000978

The flashing arrow indicates the desired limit position
The tractor is lowered to the lower limit position



Press "Return" to confirm the lower limit position

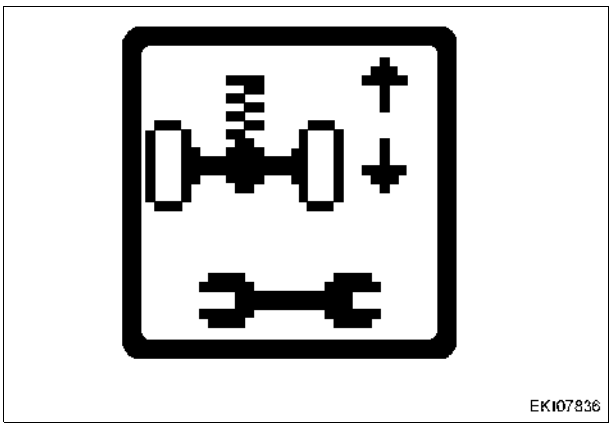


Fig. 87. I000978

If incorrect values are detected or the conditions are not met, an message appears**ERROR**

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

NOTE: *Settings are only transferred when the ignition key has been turned to "0" position.*
(Wait for at least 15 seconds before switching on the ignition again!)

7 Calibration code 2401 (steering angle sensor) (calibration only possible for tractors with Auto-Guide)

9. Calibrating the steering angle sensor (2401)

Important: The following preparatory steps must be carried out.

NOTE: *Calibration procedure from end-of-line program EOL 7.60 or higher*

– Engine is running

– Switch Auto-Guide standby button to off (LED off) or to partial activation (LED flashes)

– If fault messages are displayed, the faults must be confirmed one by one.

Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel

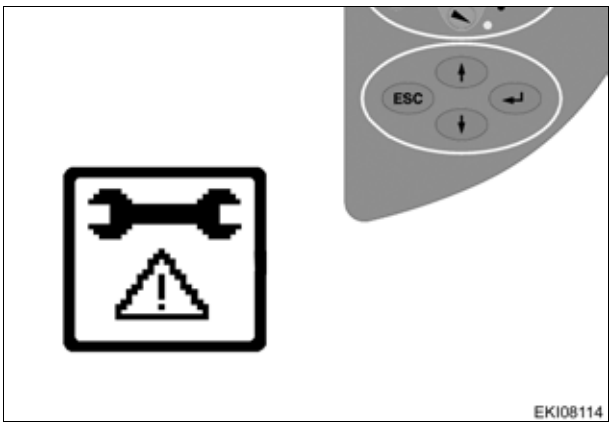
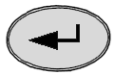


Fig. 88. I000760



Press "Return", the first main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes

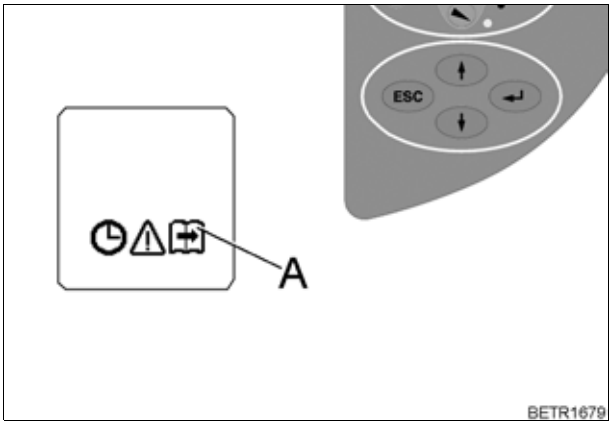
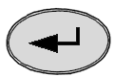


Fig. 89. I000761



Press "Return", the second main menu appears in the multiple display

The second main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes

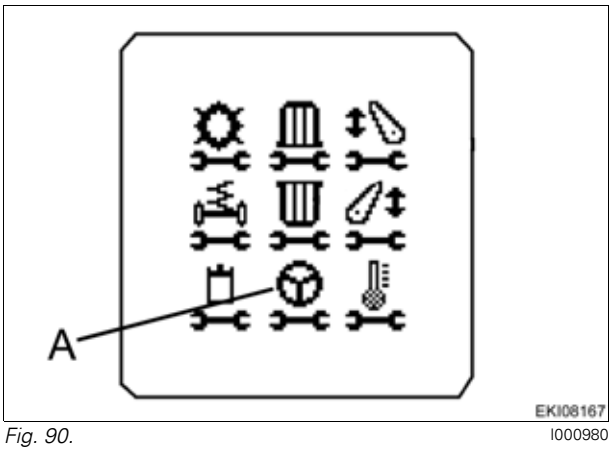
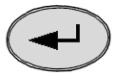
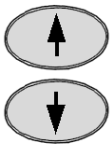


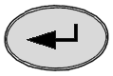
Fig. 90. I000980



Press "Return" to confirm



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return" to confirm

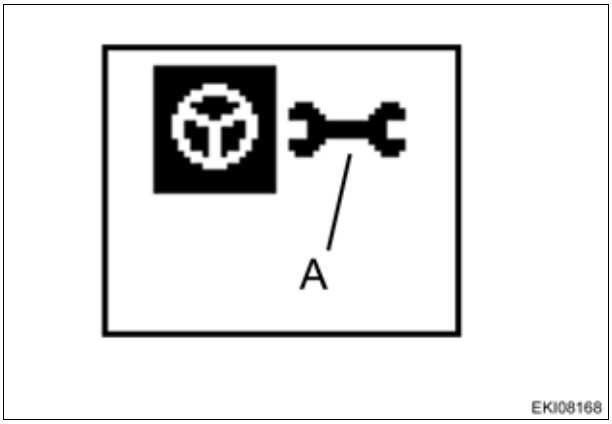
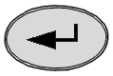


Fig. 91. I000984

Input code **2401**

Press one of the buttons until the required number is displayed



Press "Return" to confirm

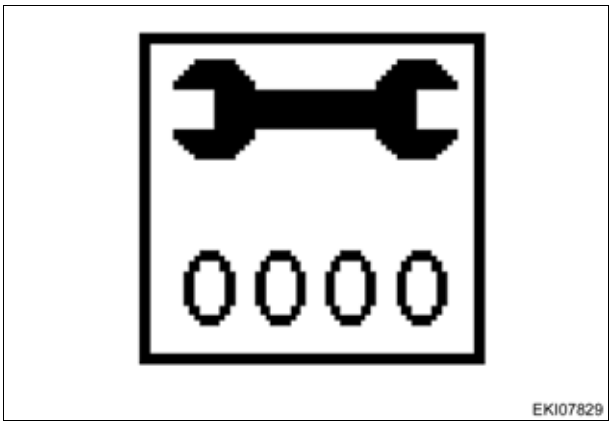
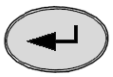


Fig. 92. I000773

Turn steering wheel against the left steering lock and hold



Press "Return" to confirm

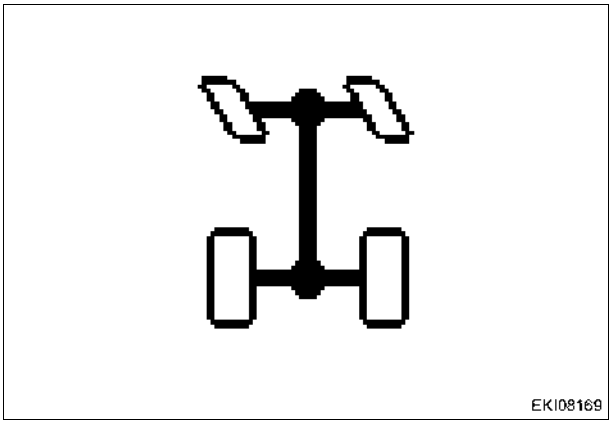
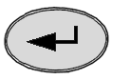


Fig. 93. I000981

Turn steering wheel against the right steering lock and hold



Press "Return" to confirm

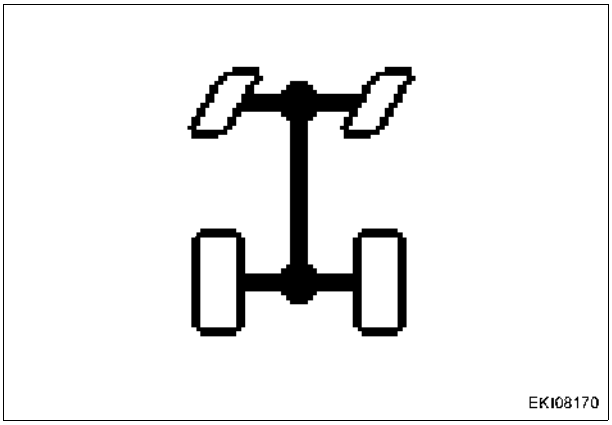
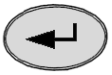


Fig. 94. I000982

Move the steering wheel to its centre position and make sure the front wheels are completely straight

NOTE: *Release hand brake and advance the tractor slowly, keeping the wheels straight.*

Press "Return" to confirm



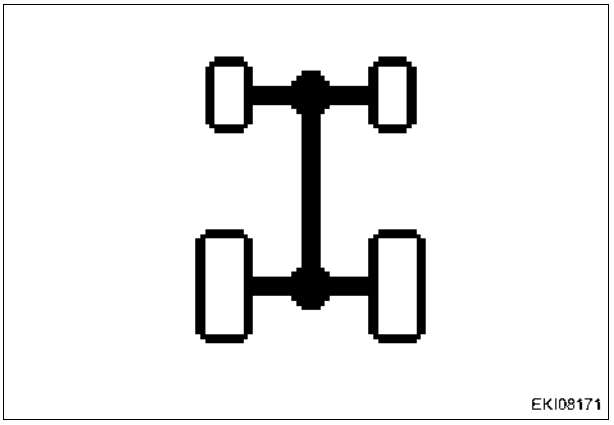


Fig. 95. I000983

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

NOTE: *Settings are only transferred when the ignition key has been turned to "0" position.*
(Wait for at least 15 seconds before switching on the ignition again!)

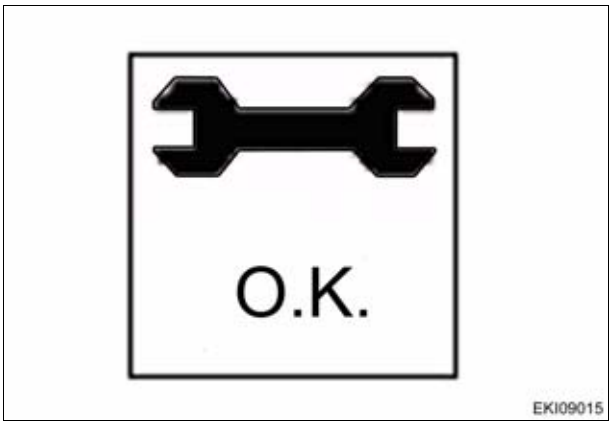


Fig. 96. I003578

If incorrect values are detected or the conditions are not met, an message appears**ERROR**

2401 = calibration code
FXX = fault code

NOTE: *The fault code is displayed from end-of-line program (EOL) 7.60 onward (Autumn 2007)*

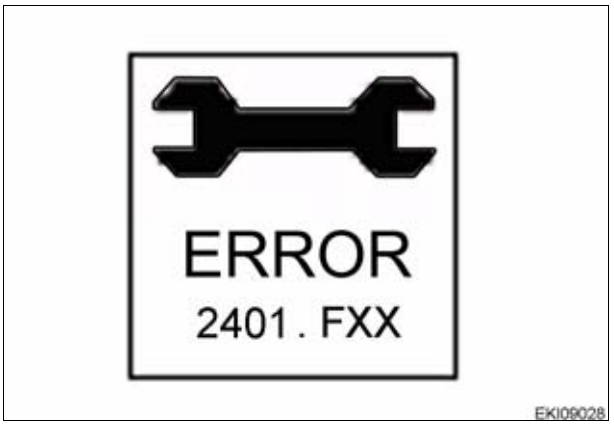


Fig. 97. I003597

Fault code	Cause
F01	Preliminary conditions not satisfied
F08	Calibration taking too long (more than 30 seconds)
F09	User terminated calibration with ESC
F10	Plausibility: "Centre position" signal
F11	Plausibility: "Left stop" signal
F12	Plausibility: "Right stop" signal
F13	Plausibility: Calibrated values match

8 Calibration code 2403 (Auto-Guide control valve) (calibration only possible for tractors with Auto-Guide)

9. Calibrating Auto-Guide control valve

NOTE: *If a new **A050** - ECU, basic control unit has been installed, carry out transmission calibration 4001–4010.*

Important: The following preparatory steps must be carried out

NOTE: *Calibration procedure from end-of-line program EOL 7.60 or higher*

– Seat switch actuated
– Engine is running
– Tractor stationary
– Steering set straight
– Steering wheel not actuated
– Auto-Guide standby button (B) at off (LED off) or partial activation (LED flashes)

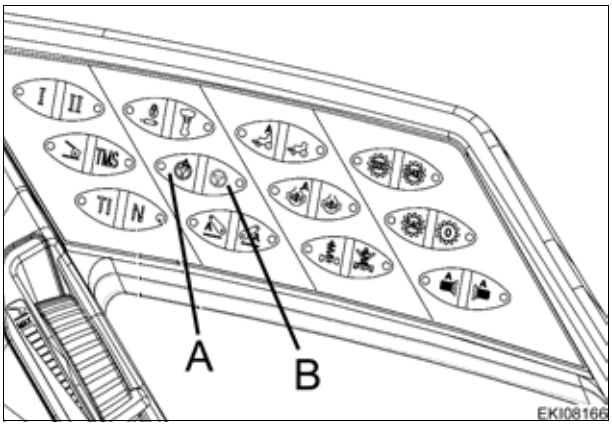


Fig. 98. I000979

- Warning and fault messages must be confirmed individually

Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel

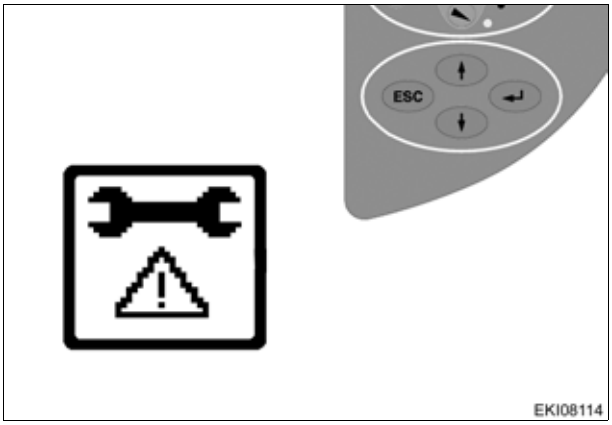
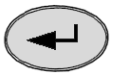
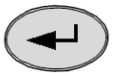


Fig. 99. I000760



Press "Return", the first main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return", the second main menu appears in the multiple display

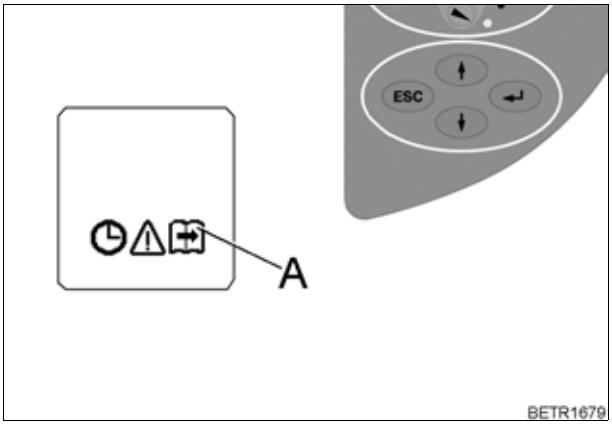
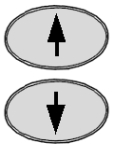
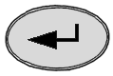


Fig. 100. I000761

The second main menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return" to confirm

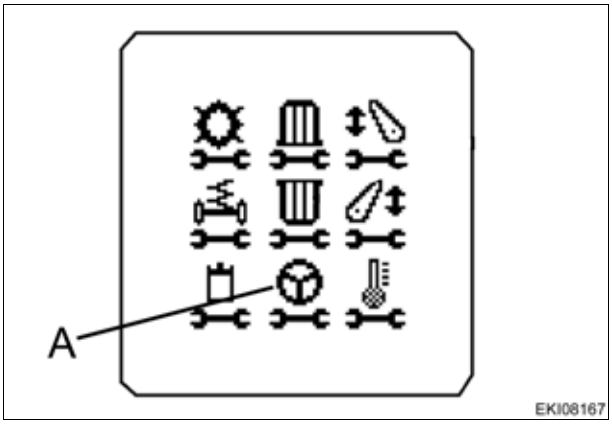
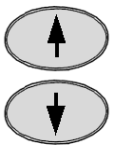
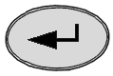


Fig. 101. I000980



Press one of the buttons repeatedly until the symbol (A) flashes

Press "Return" to confirm



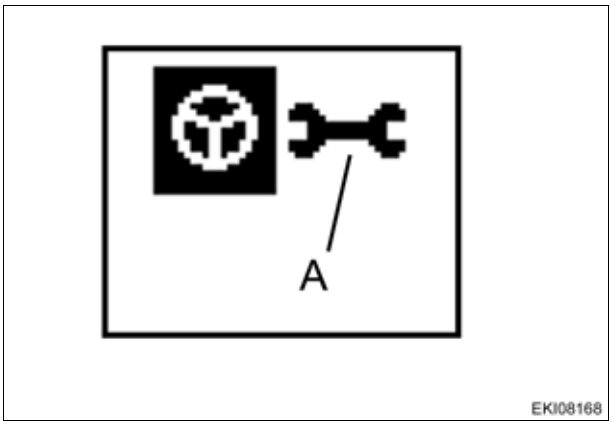
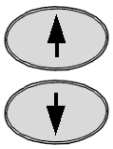


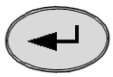
Fig. 102. I000984

Input code **2403**



Press one of buttons until desired number is displayed

Press "Return" to confirm



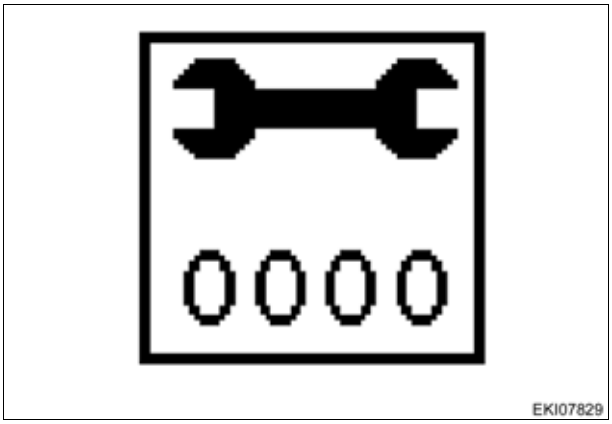


Fig. 103. I000773

The following image is displayed

NOTE: *The calibration is carried out automatically. (approx. 5 minutes max.)*
Do not actuate steering!
Do not leave driver seat (seat switch) !

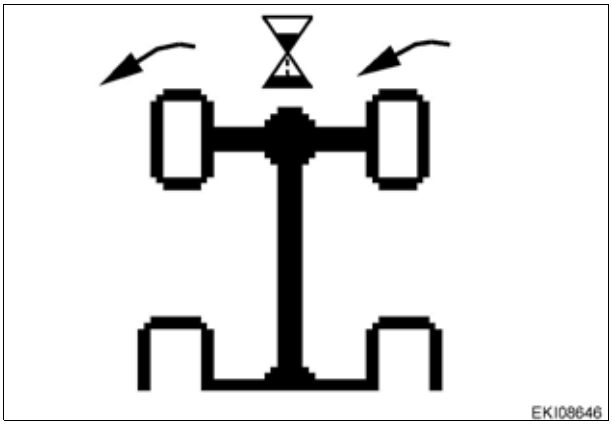


Fig. 104. I002515

The following image is displayed

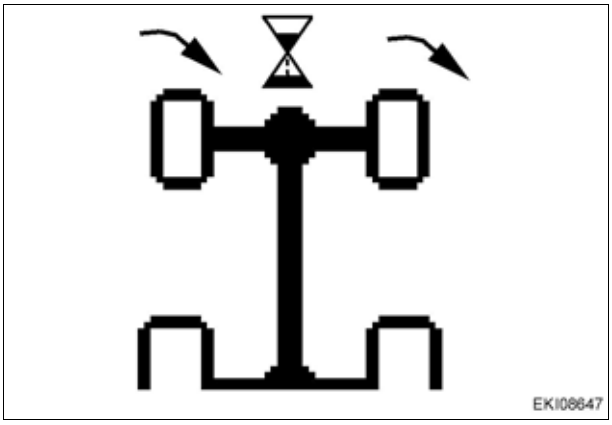


Fig. 105. I002516

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

NOTE: *Settings are only transferred when ignition key has been turned to "0" position.*
(Wait for at least 15 seconds before switching on the ignition again!)

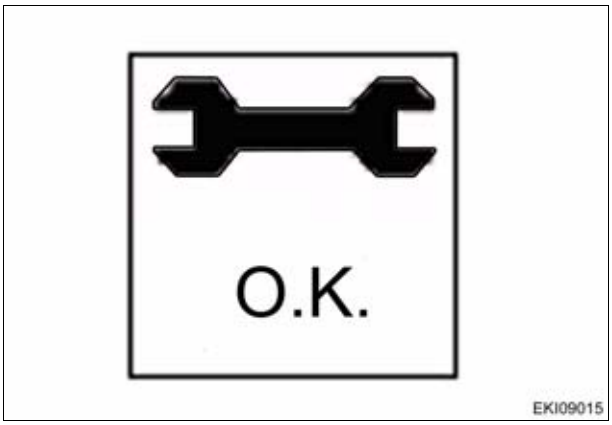


Fig. 106. I003578

If incorrect values are detected or the conditions are not met, an **ERROR** message appears

2403 = calibration code
FXX = fault code

NOTE: *The fault code is displayed from end-of-line program (EOL) 7.60 onward (Autumn 2007)*

Fig. 107. I003598

Fault code	Cause
F01	Preliminary conditions not satisfied
F02	Front wheels are not straight
F03	Manual steering wheel actuation during calibration
F06	No movement in direction "steering to left"
F07	No movement in direction "steering to right"
F08	Calibration taking too long
F09	User terminated calibration with ESC
F11	Plausibility: Signal in direction "steering to left"
F12	Plausibility: Signal in direction "steering to right"

9 Calibration code 6034 (rear PTO clutch)

10. Calibration of rear PTO coupling time

The load-dependent start-up of the rear PTO is stored in the **A050** - ECU, basic control unit.
The rear PTO clutch is calibrated to adapt the coupling operation to the implement concerned.
The **A050** - ECU, basic control unit can be taught, i.e. after a few coupling operations it adapts the PTO start-up to the respective implement.

NOTE: *For optimum adaptation of the PTO start-up, calibrate the rear PTO with the implement connected.*

DANGER: During calibration, the PTO may rotate slightly.
Follow all necessary safety procedures.

Calibrating the rear PTO clutch

Important: The following preparatory steps must be carried out.

- Hand brake applied
- Start engine.
- Preselect any PTO setting (540/540E/1000)
- If fault messages are displayed, the faults must be confirmed one by one.

Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel

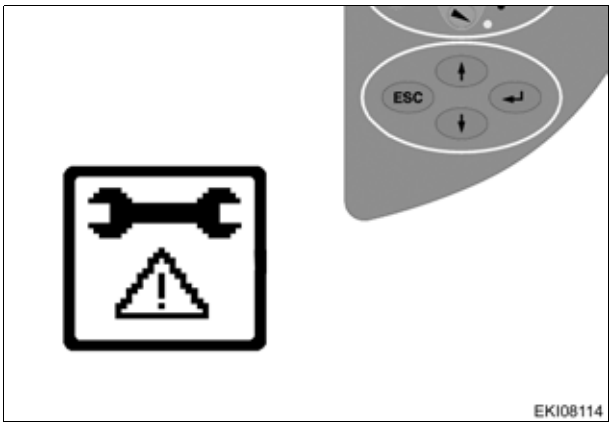
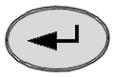
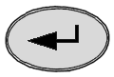


Fig. 108. I000760



Press "Return", the first main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return", the second main menu appears in the multiple display

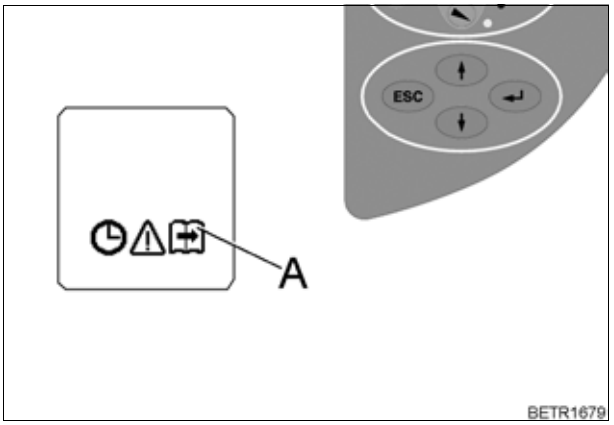
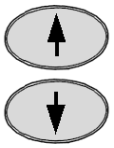
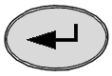


Fig. 109. I000761

The second main menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return" to confirm

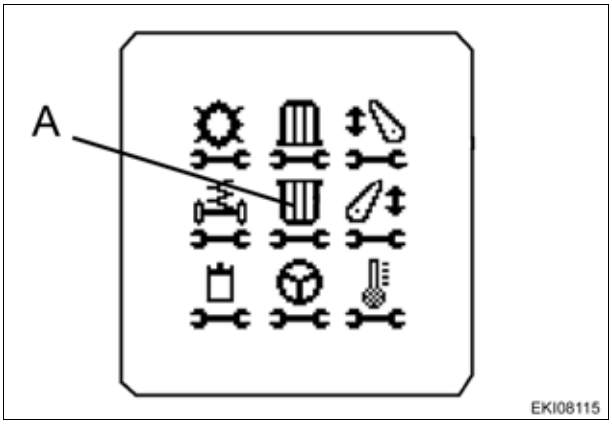
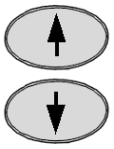


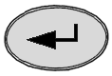
Fig. 110. I000765

The rear PTO menu appears on the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes

Press "Return" to confirm



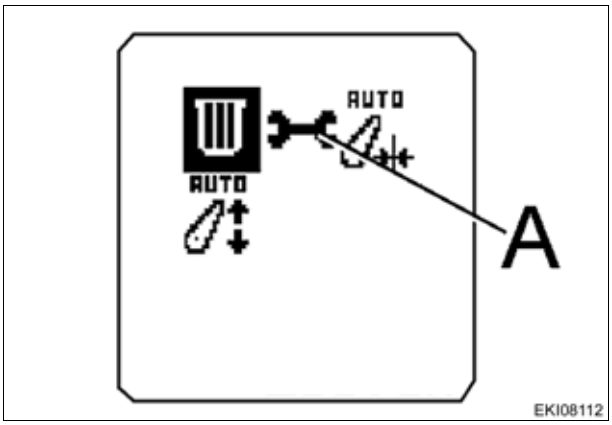
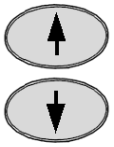


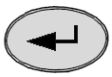
Fig. 111. I000770

Input code **6034**



Press one of buttons until desired number is displayed

Press "Return" to confirm



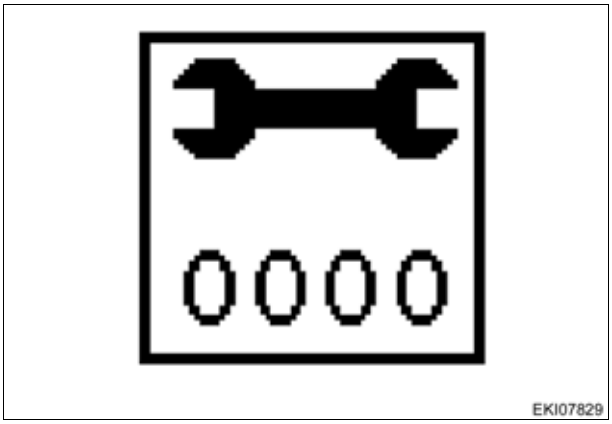


Fig. 112. I000773

Preselect any PTO setting (540, 540E, 1000)
Engage rear PTO

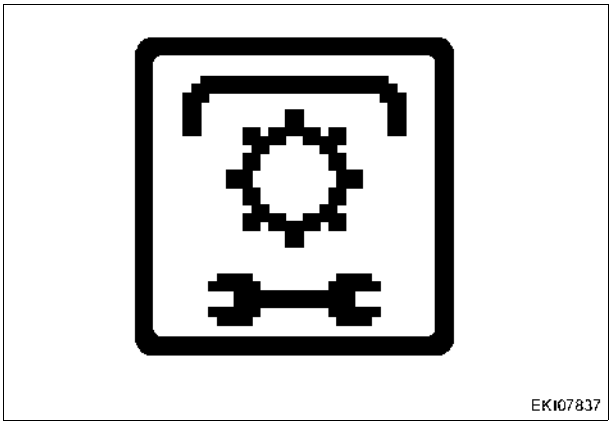


Fig. 113. I000775

If incorrect values are detected or the conditions are not met, an **ERROR** message appears

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

NOTE: *Settings are only transferred when ignition key has been turned to "0" position.*
(Wait for at least 15 seconds before switching on the ignition again!)

10 Calibration code 7034 (front PTO clutch)

11. Calibration – front PTO coupling time

The load-dependent start-up of the front PTO is stored in the **A050** - ECU, basic control unit.
The rear PTO clutch is calibrated to adapt the coupling operation to the implement concerned.
The **A050** - ECU, basic control unit can be taught, i.e. after a few coupling operations it adapts the PTO start-up to the respective implement.

NOTE: *For optimum adaptation of the PTO start-up, calibrate the front PTO with the implement connected.*

DANGER: During calibration, the PTO may rotate slightly.
Follow all necessary safety procedures.

Calibrating the front PTO clutch

Important: The following preparatory steps must be carried out.

- Hand brake applied
- Start engine.
- If fault messages are displayed, the faults must be confirmed one by one.

Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel

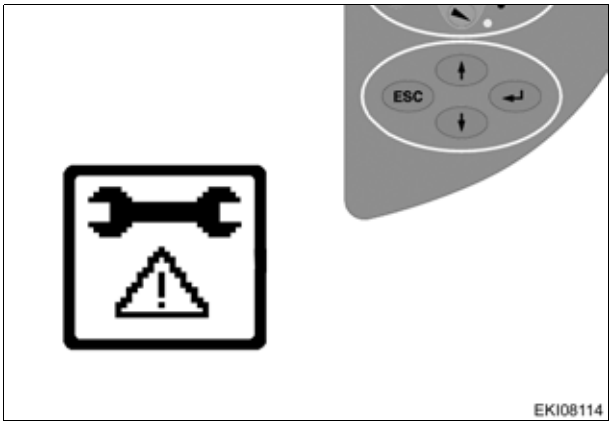
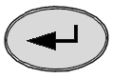
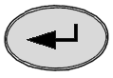


Fig. 114. I000760



Press "Return", the first main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return", the second main menu appears in the multiple display

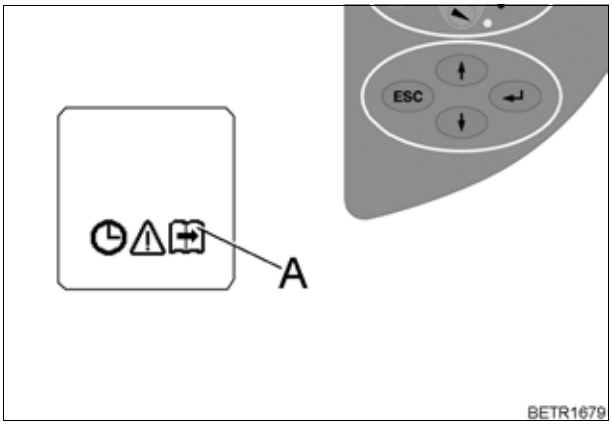
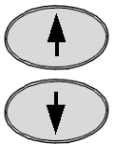


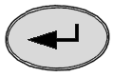
Fig. 115. I000761

The second main menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes

Press "Return" to confirm



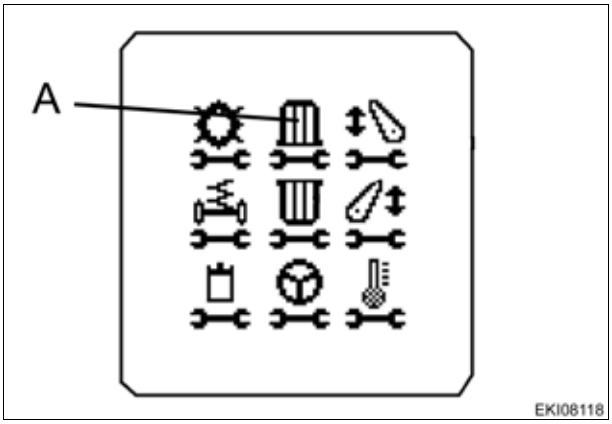
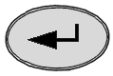


Fig. 116. I000802

The rear PTO menu appears on the multiple display

Press "Return" to confirm



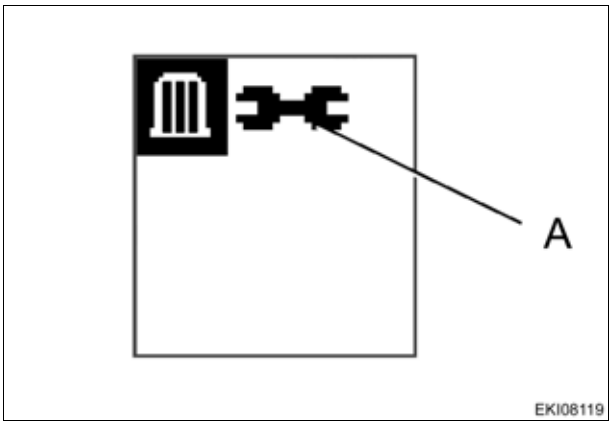
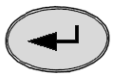


Fig. 117. I000804

Input code **7034**

Press one of buttons until desired number is displayed

Press "Return" to confirm



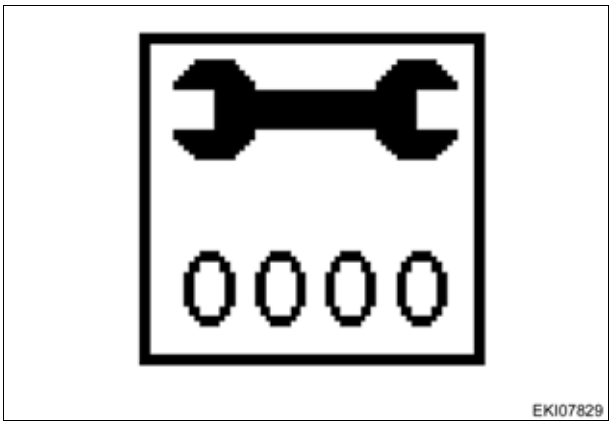


Fig. 118. I000773

Couple the front PTO

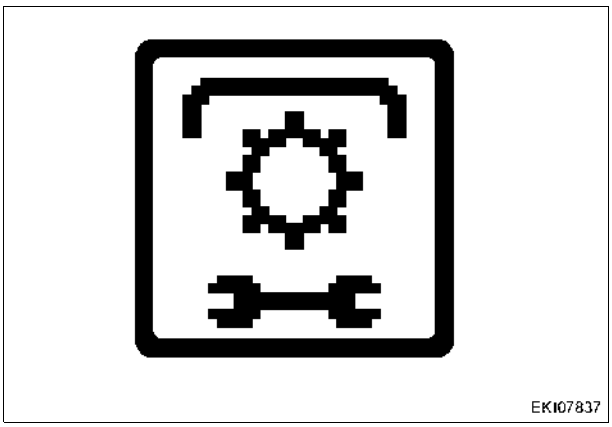


Fig. 119. I000775

If incorrect values are detected or the conditions are not met, an **ERROR** message appears

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

NOTE: *Settings are only transferred when ignition key has been turned to "0" position.*
(Wait for at least 15 seconds before switching on the ignition again!)

11 Calibration code 4001 (drive clutch pedal)

12. Calibrating the drive clutch pedal

Important: The following preparatory steps must be carried out.

– Ignition ON

– Hand brake applied

– If fault messages are displayed, the faults must be confirmed one by one.

Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel

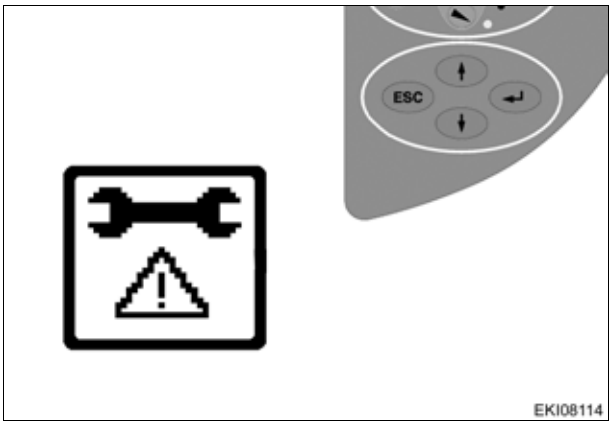
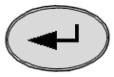
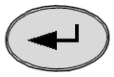


Fig. 120. I000760



Press "Return", the first main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return", the second main menu appears in the multiple display

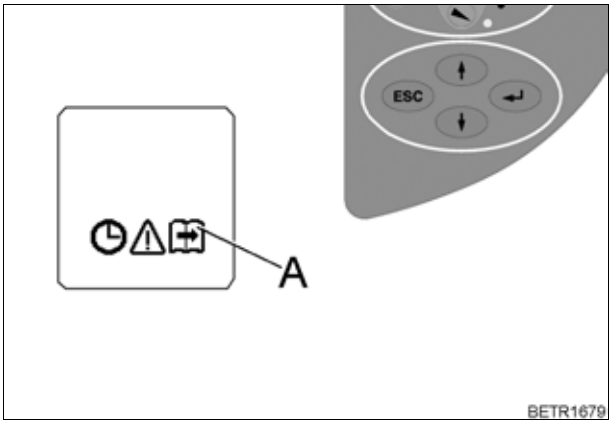
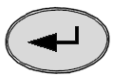


Fig. 121. I000761

The second main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return" to confirm

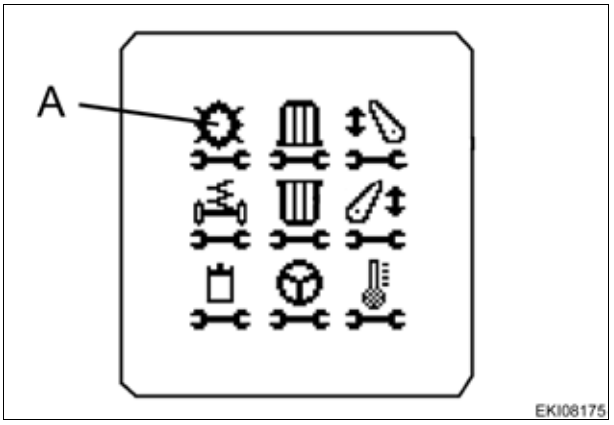
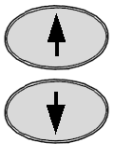
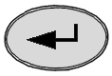


Fig. 122. I000988

The transmission menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return" to confirm

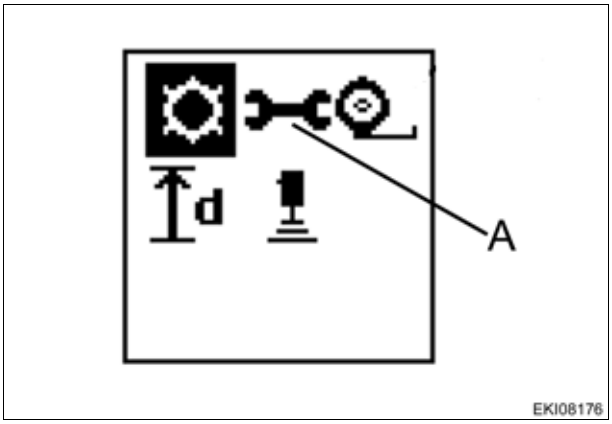
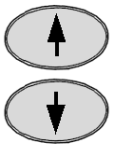


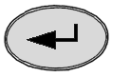
Fig. 123. I000989

Input code **4001**



Press one of the buttons until the required number is displayed

Press "Return" to confirm



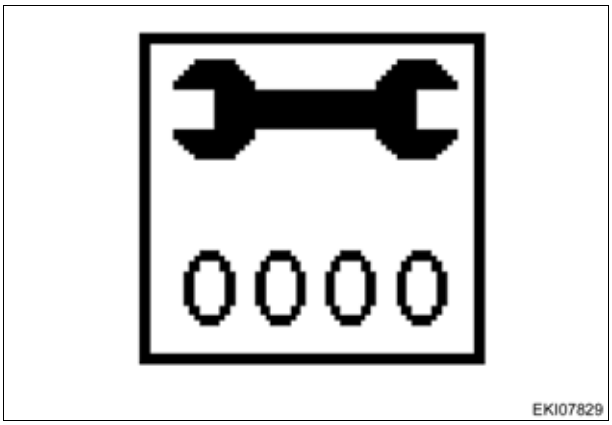
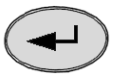


Fig. 124. I000773

Clutch pedal **not** depressed

Press "Return" to confirm



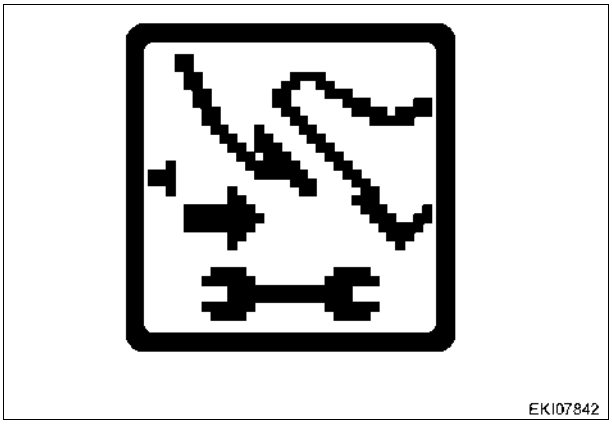
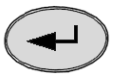


Fig. 125. I000990

Clutch pedal depressed

Press "Return" to confirm



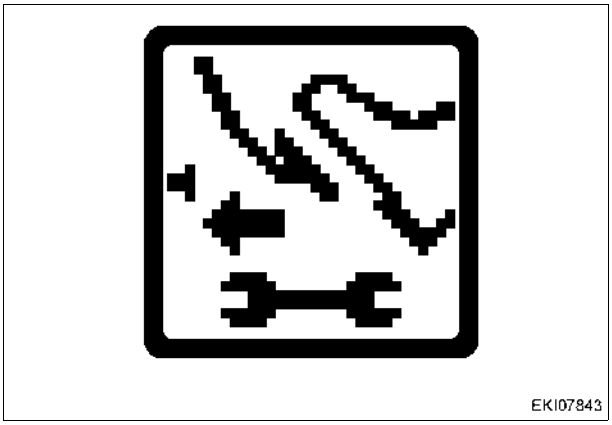


Fig. 126. I000991

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

NOTE: *Settings are only transferred when the ignition key has been switched to "0" position.*
(Wait for at least 15 seconds before switching on the ignition again!)

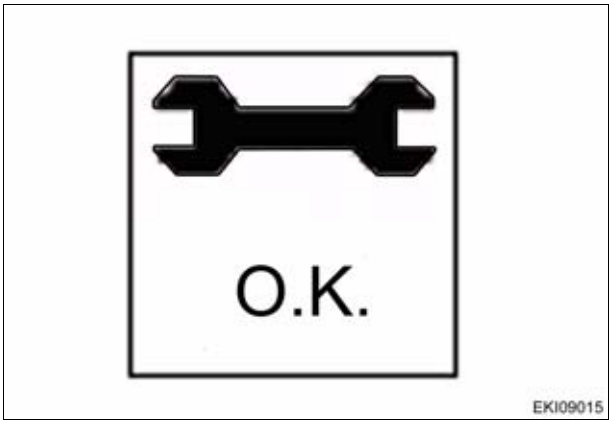


Fig. 127. I003578

If incorrect values are detected or the conditions are not met, an message appears**ERROR**

4001 = calibration code
FXX = error code (see table)

NOTE: *The fault code is displayed from end-of-line program (EOL) 7.60 onward (Autumn 2007)*

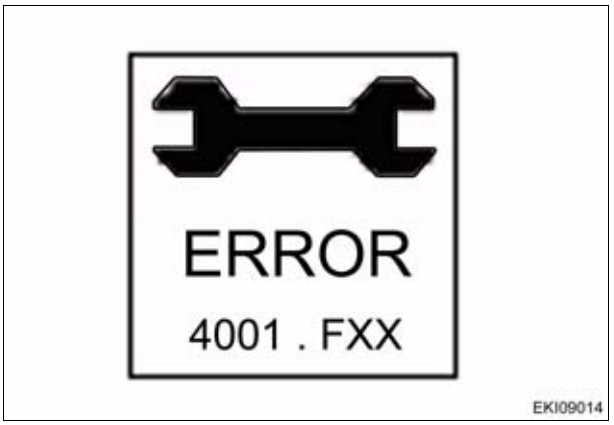


Fig. 128. I003579

Fault code	Cause
F01	Terminated by user
F02	Pedal in rest position: Signal greater than allowed (22 mA)
F03	Pedal in rest position: Signal smaller than allowed (2 mA)
F04	Pedal fully depressed: Signal greater than allowed (22 mA)
F05	Pedal fully depressed: Signal smaller than allowed (2 mA)
F06	Calibrated min. and max. values are too close together. Minimum difference of 10 mA necessary
F07	Calibration taking too long (more than 30 seconds)

12 Calibration code 4002 (hand throttle)

13. Calibrating the hand throttle (4002)

Important: The following preparatory steps must be carried out.

– Hand brake applied

– Ignition ON

– If fault messages are displayed, the faults must be confirmed one by one.

Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel

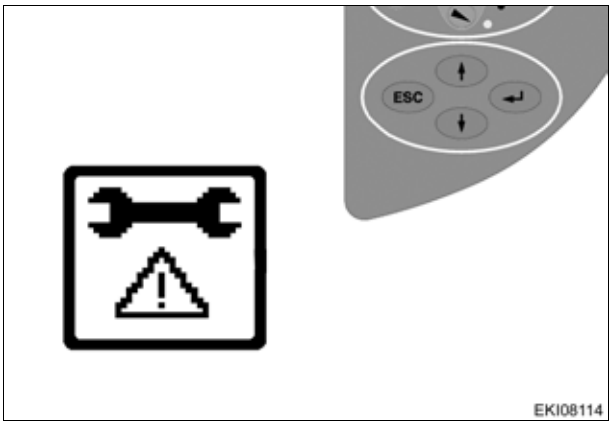
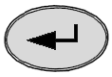


Fig. 129. I000760



Press "Return", the first main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes

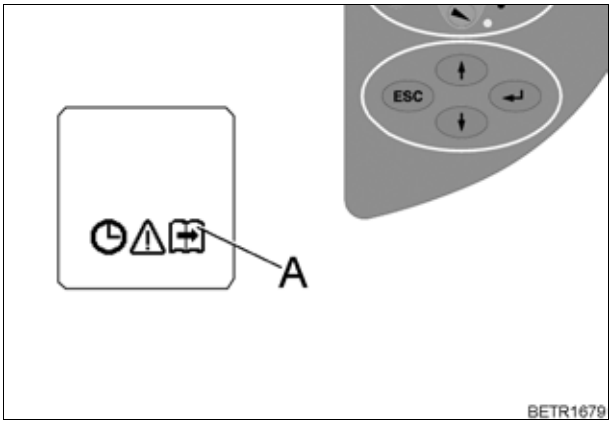
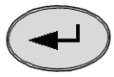


Fig. 130. I000761



Press "Return", the second main menu appears in the multiple display

The second main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes

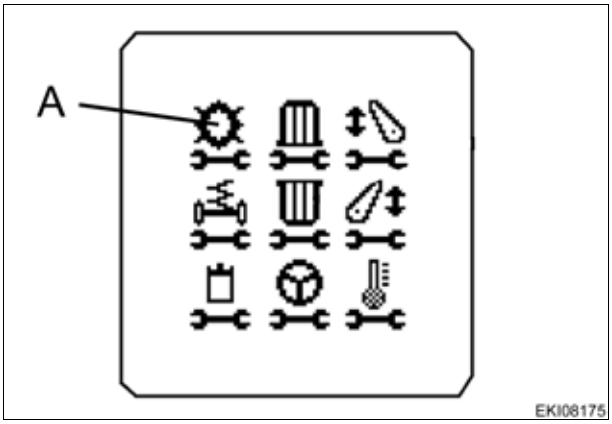
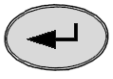
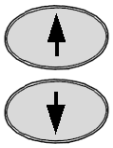


Fig. 131. I000988

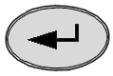


Press "Return" to confirm

The transmission menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return" to confirm

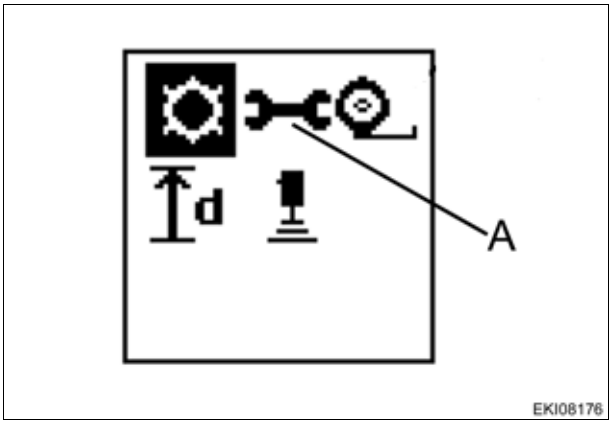
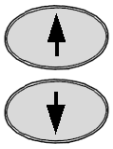


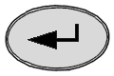
Fig. 132. I000989

Input code **4002**



Press one of the buttons until the required number is displayed

Press "Return" to confirm



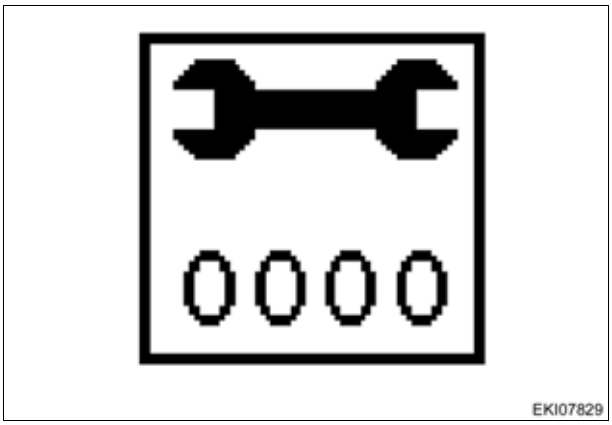
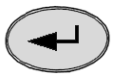


Fig. 133. I000773

Turn hand throttle to the **maximum** position

Press "Return" to confirm



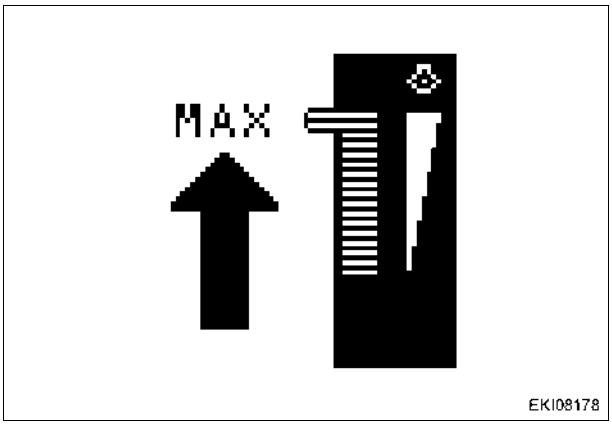
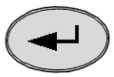


Fig. 134. I000994

Turn hand throttle to the **minimum** position

Press "Return" to confirm



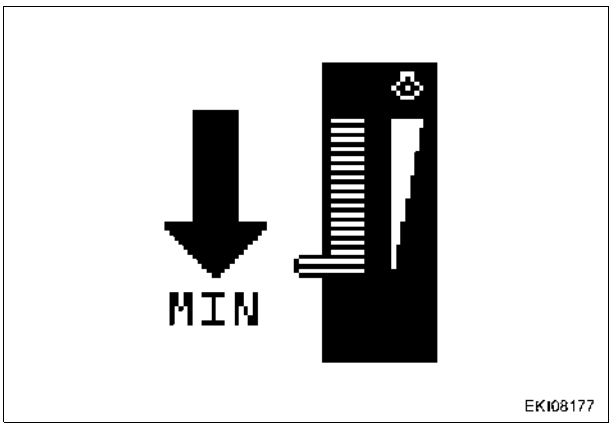


Fig. 135. I000993

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

NOTE: *Settings are only transferred when the ignition key has been switched to "0" position.*
(Wait for at least 15 seconds before switching on the ignition again!)

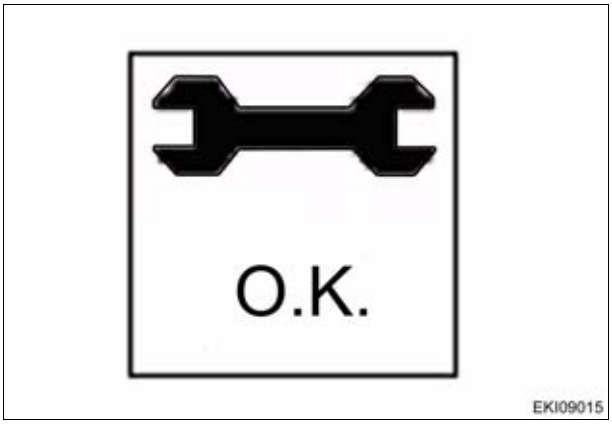


Fig. 136. I003578

If incorrect values are detected or the conditions are not met, an message appears**ERROR**

4002 = calibration code
FXX = error code (see table)

NOTE: *The fault code is displayed from end-of-line program (EOL) 7.60 onward (Autumn 2007)*

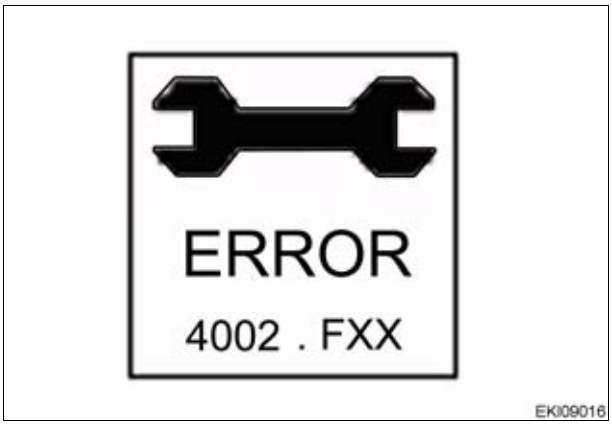


Fig. 137. I003580

Fault code	Cause
F02	Calibrated values of current hand throttle position invalid
F03	A039 multifunction armrest failing to report
F08	Calibration taking too long (more than 30 seconds)
F09	Terminated by user

13 Calibration code 4003 (travel range selector)

14. Calibrating the travel range selector (4003)

Important: The following preparatory steps must be carried out.

- Transmission oil temperature approx. 40°C
- Hand brake applied
- Start engine
- Clutch pedal actuated
- Engine speed approx. 800 rpm (idle speed)
- If fault messages are displayed, the faults must be confirmed one by one.

Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel

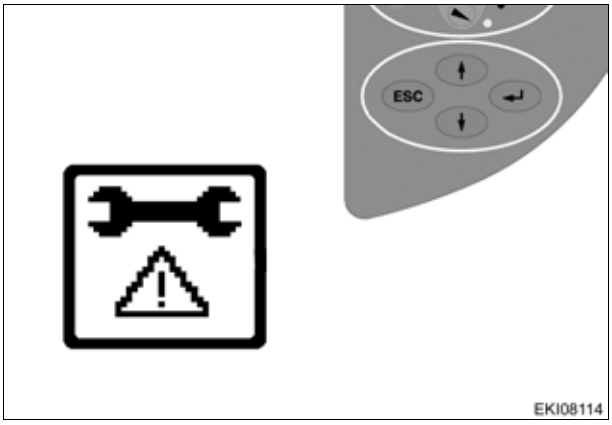
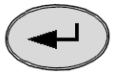
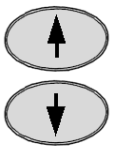


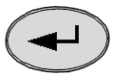
Fig. 138. I000760



Press "Return", the first main menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return", the second main menu appears in the multiple display

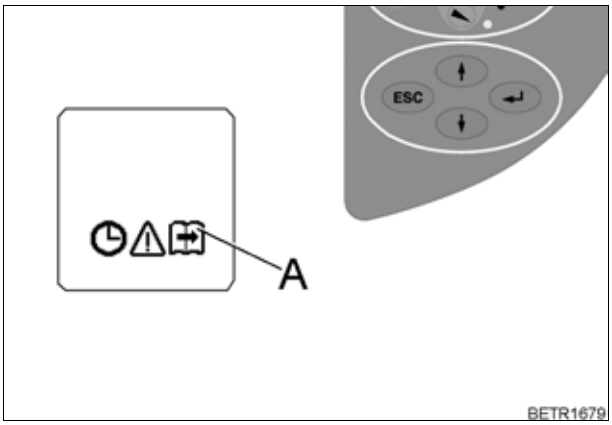
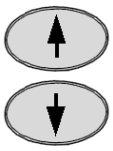
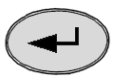


Fig. 139. I000761

The second main menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return" to confirm

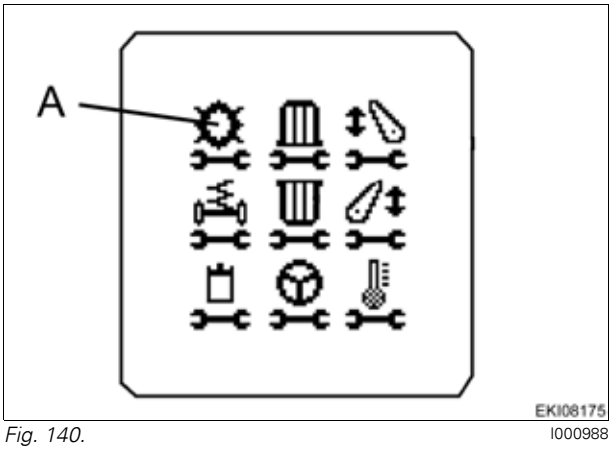
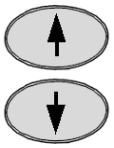


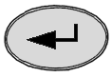
Fig. 140. I000988

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-

The transmission menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return" to confirm

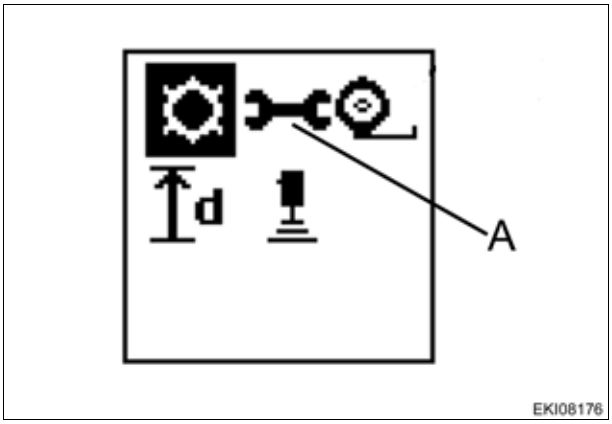
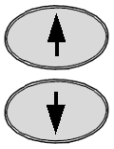


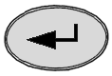
Fig. 141. I000989

Input code **4003**



Press one of buttons until desired number is displayed

Press "Return" to confirm



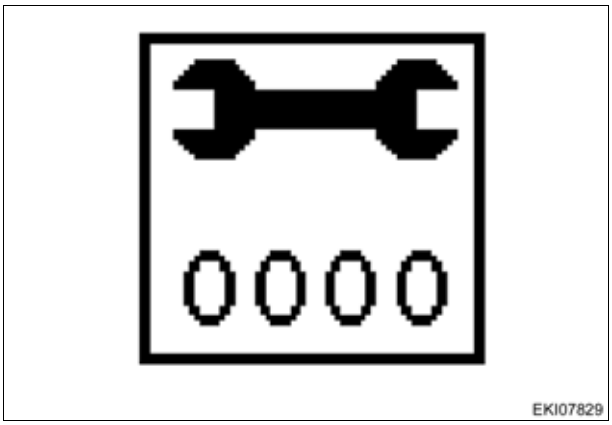


Fig. 142. I000773

Travel range I is displayed and enabled automatically

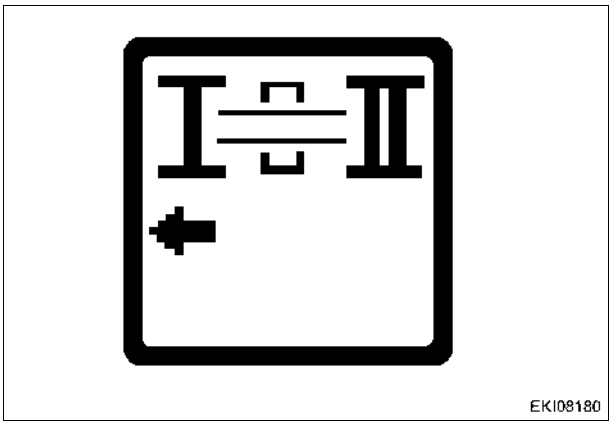


Fig. 143. I001005

Travel range II is displayed and enabled automatically

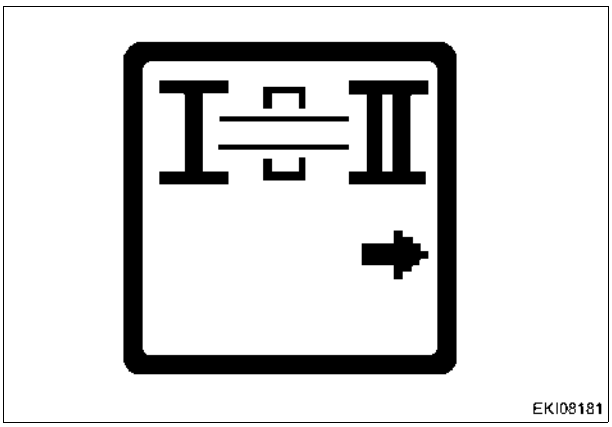


Fig. 144. I001006

The centre position is displayed and enabled automatically

If incorrect values are detected or the conditions are not met, an message appears**ERROR**

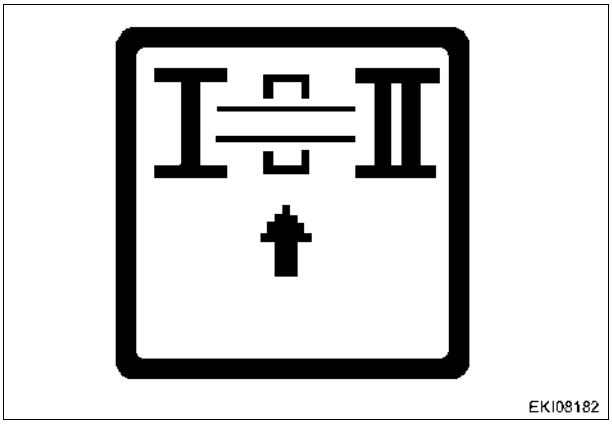


Fig. 145. I001008

If calibration is completed without errors, the screen appears and the new settings are saved.

Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel

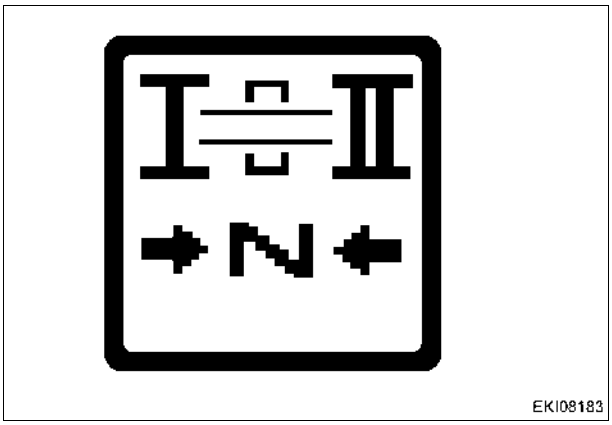


Fig. 146. I001009

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

NOTE: *Settings are only transferred when ignition key has been turned to "0" position.*
(Wait for at least 15 seconds before switching on the ignition again!)

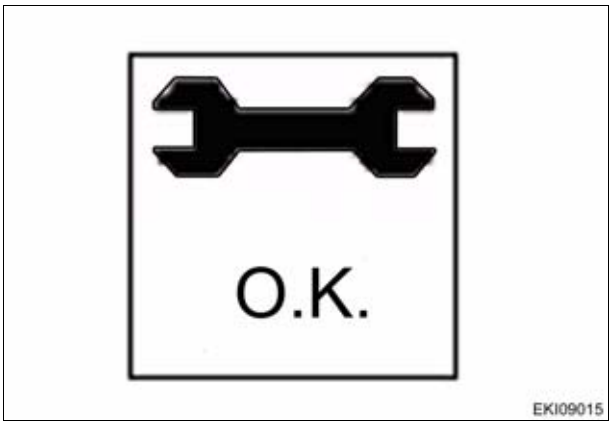


Fig. 147. I003578

If incorrect values are detected or the conditions are not met, an message appears**ERROR**

4003 = calibration code
FXX = fault code

NOTE: *The fault code is displayed from end-of-line program (EOL) 7.60 onward (Autumn 2007)*

Fig. 148. I003583

Fault code	Cause
F01	Terminated by user
F02	Speed above 0.1 km/h
F03	Engine speed below 600 rpm
F04	Engine speed above 900 rpm
F05	Transmission not in neutral
F06	Clutch not depressed
F07	B015 bevel pinion sensor faulty
F08	B014 hydrostatic collecting shaft sensor faulty
F09	B010 engine speed sensor faulty
F10	Neutral button, driving switch faulty (A039 multifunction armrest)
F11	B016 travel range detection sensor faulty
F12	Y002 travel range I solenoid valve faulty
F13	Y003 travel range II solenoid valve faulty
F20	Calibrated values for neutral position incorrect
F23	Calibrated values do not match
F30	Error while reading from EEPROM (A050 ECU, basic control unit)
F31	Error while writing to EEPROM (A050 ECU, basic control unit)

14 Calibration code 4005 (foot throttle/throttle pedal)

15. Calibrating the foot throttle/throttle pedal (4005)

Important: The following preparatory steps must be carried out.

– Hand brake applied

– Ignition ON

– If fault messages are displayed, the faults must be confirmed one by one.

Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel

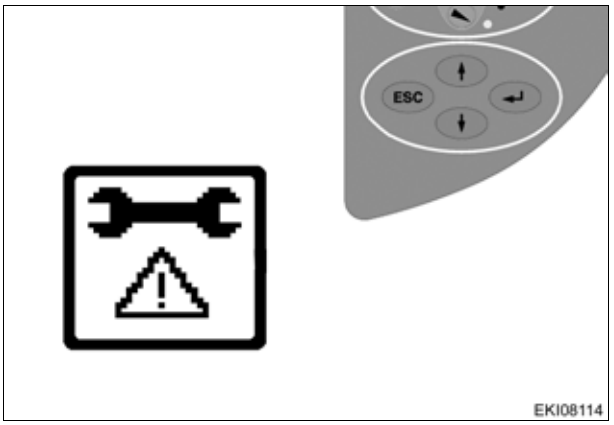
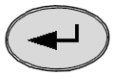
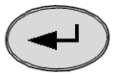


Fig. 149. I000760



Press "Return", the first main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return", the second main menu appears in the multiple display

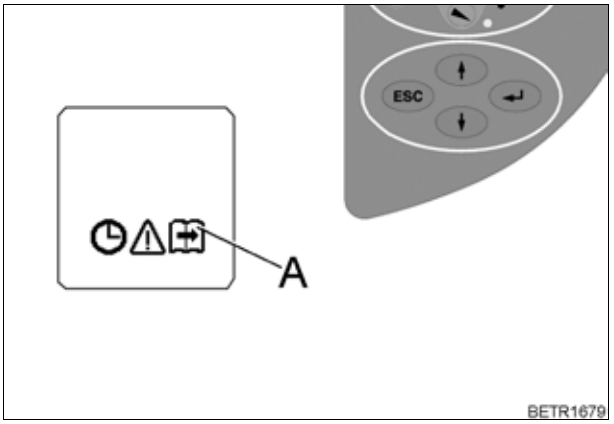
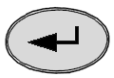


Fig. 150. I000761

The second main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return" to confirm

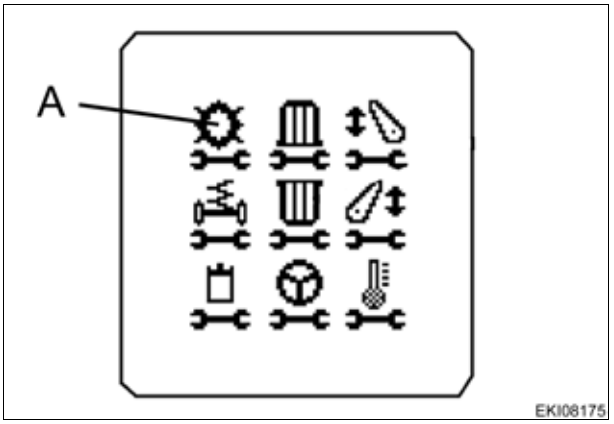
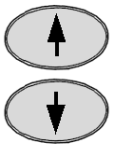
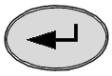


Fig. 151. I000988

The transmission menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return" to confirm

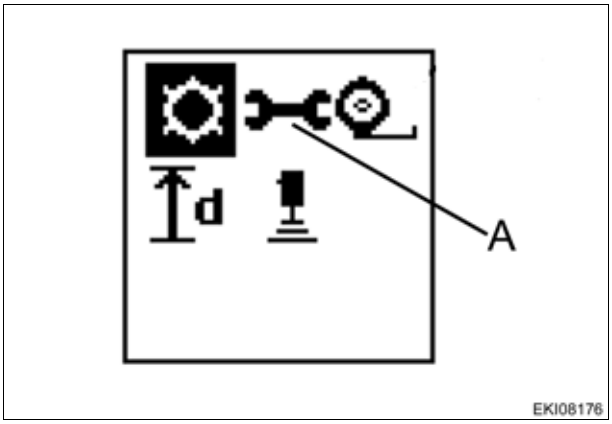
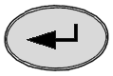


Fig. 152. I000989

Input code **4005**

Press one of buttons until desired number is displayed

Press "Return" to confirm



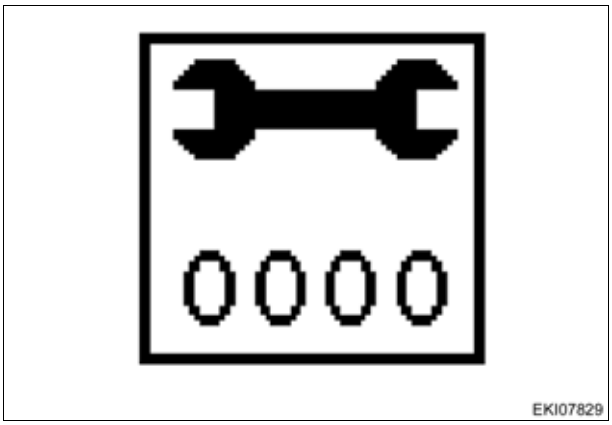
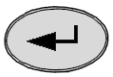


Fig. 153. I000773

Depress foot throttle/throttle pedal **fully**

Press "Return" to confirm



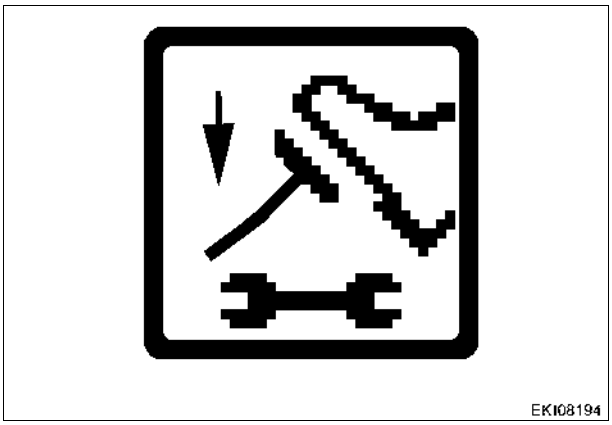
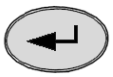


Fig. 154. I001121

Foot throttle/throttle pedal **in idle position**

Press "Return" to confirm



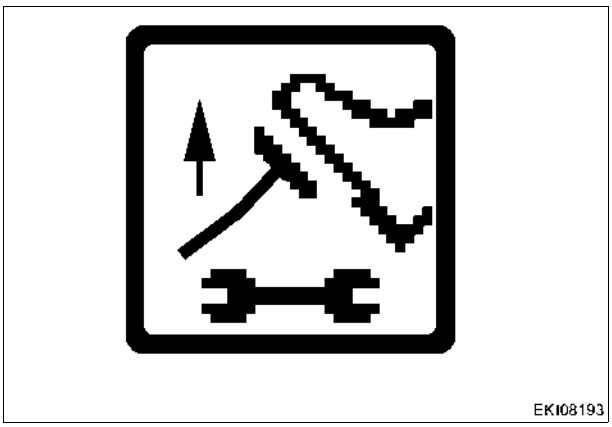


Fig. 155. I001120

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

NOTE: *Settings are only transferred when ignition key has been turned to "0" position.*
(Wait for at least 15 seconds before switching on the ignition again!)

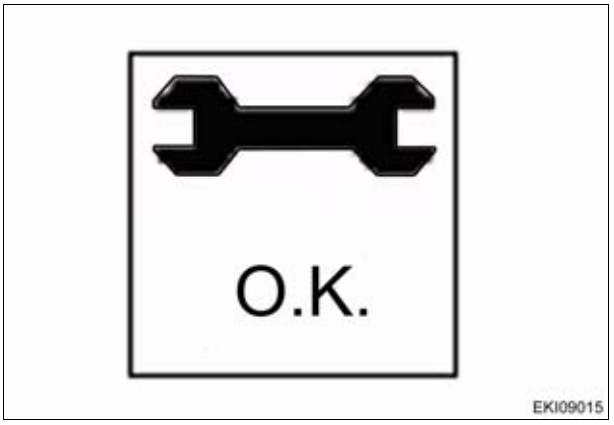


Fig. 156. I003578

If incorrect values are detected or the conditions are not met, an message appears**ERROR**

4005 = calibration code
FXX = fault code

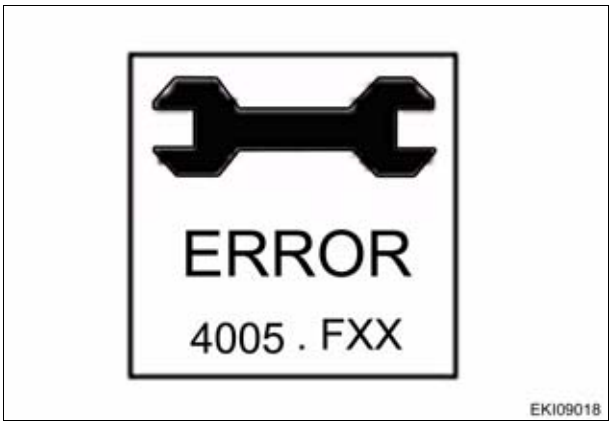


Fig. 157. I003584

Fault code	Cause
F21	Transmission not in neutral
F22	Current from B055 sensor (A050 ECU, basic control unit) too low (below 3 mA)
F23	Current from B055 sensor (A050 ECU, basic control unit) too high (above 21 mA)
F24	Rotation angle of B055 sensor (A050 ECU, basic control unit) to great (more than 250 steps)
F25	B055 sensor (A050 ECU, basic control unit): Distance between idle and full throttle too short (less than 12 mA) **or** B055 sensor, foot throttle incorrectly calibrated
F26	B055 sensor (A051 ECU, engine control unit): Distance between idle and full throttle too short (less than 70%) **or** B055 sensor, foot throttle incorrectly calibrated
F27	Time for a calibration increment exceeded (more than 60 seconds)
F28	Error on saving the calibration to the EEPROM of the A050 base control unit

15 Calibration code 4007 (transmission ratio characteristic)

16. Calibrating the transmission ratio characteristic

Important: The following preparatory steps must be carried out.

- Transmission oil temperature approx. 40°C
- Hand brake applied
- Start engine
- Tractor stationary (below 0.01 km/h)
- Engine speed 1600 rpm +/- 30
- The engine speed must not drop below 1400 rpm during calibration
- No error messages from speed sensors (B010 sensor, engine speed and B014 sensor, hydrostatic collecting shaft)
- Neutral switch not in neutral (LED off). Transmission is engaged ("ACTIVE STATIONARY")
- Range selector in neutral (normal after calibration of the travel range selector (code 4003))
  Manually set the transmission to neutral via the emergency operation if necessary.
- Clutch pedal not depressed
- If fault messages are displayed, the faults must be confirmed one by one.

Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel

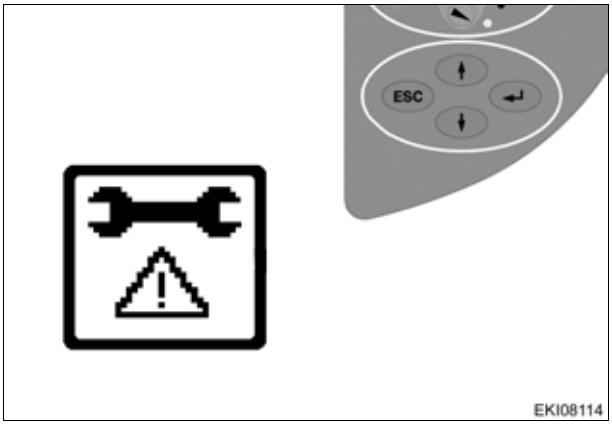


Fig. 158. I000760

"Transmission in ACTIVE STATIONARY" display

Press "ESC" to confirm

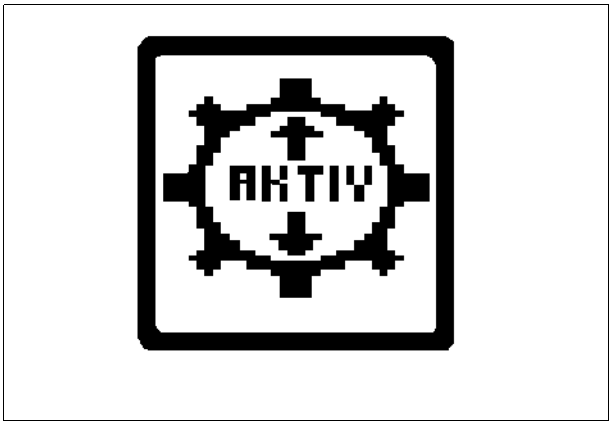


Fig. 159. I000554

"Transmission in neutral" display

Press "ESC" to confirm

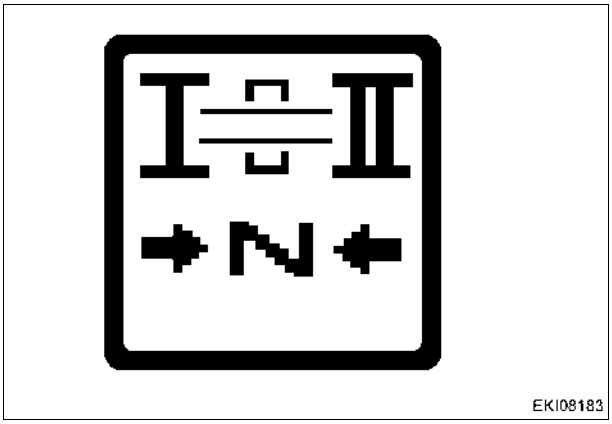
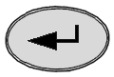
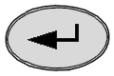


Fig. 160. I001009



Press "Return", the first main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return", the second main menu appears in the multiple display

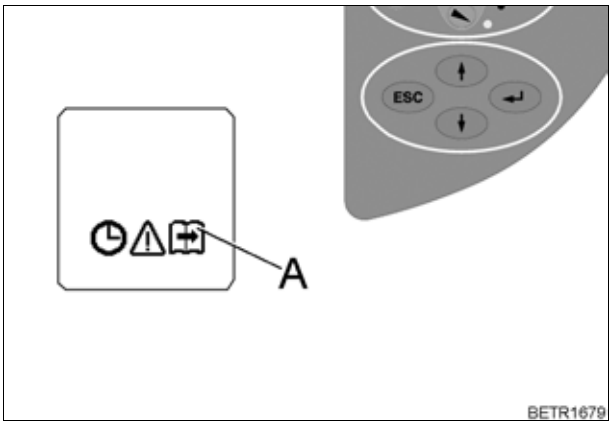
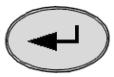


Fig. 161. I000761

The second main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return" to confirm

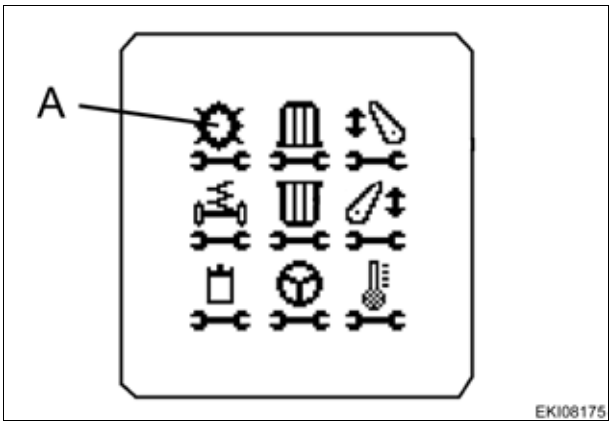
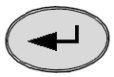


Fig. 162. I000988

The transmission menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return" to confirm

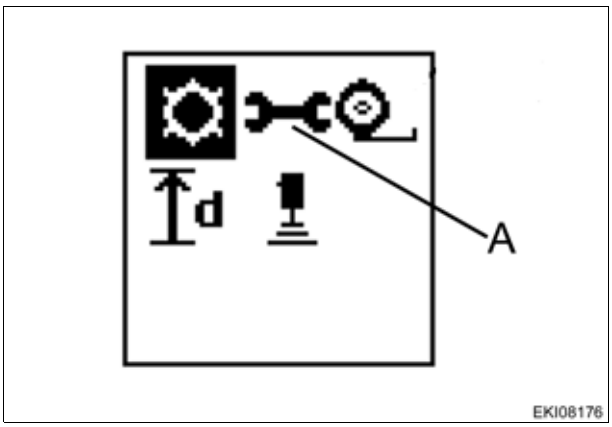
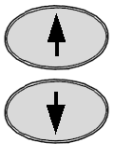


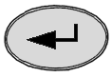
Fig. 163. I000989

NOTE: *Since the transmission automatically reverts to neutral after 15 sec, if the hand brake is applied, reactivate the transmission if necessary.*

Input code **4007**



Press one of the buttons until the required number is displayed



Press "Return" to confirm

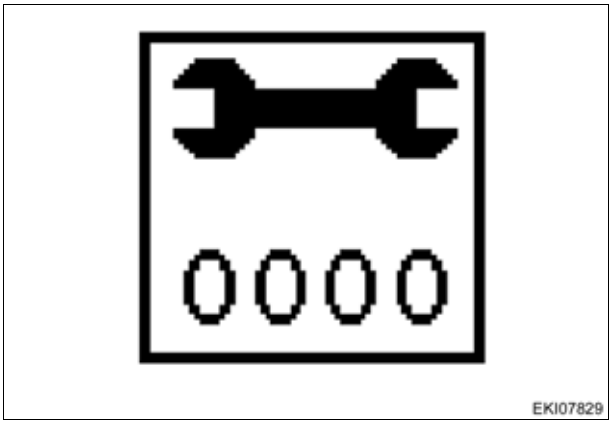


Fig. 164. I000773

Step1 (test step 1) to …

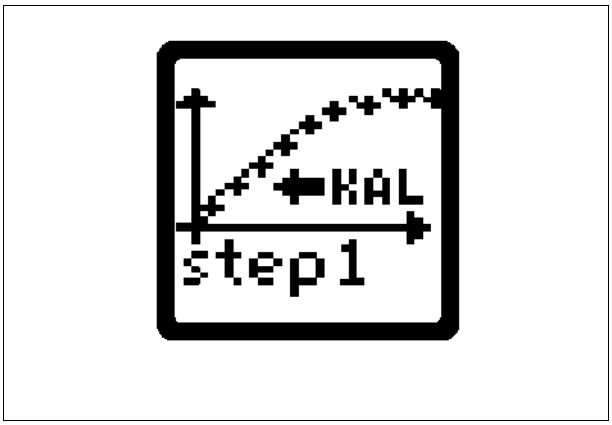


Fig. 165. I000555

… Step7 (test step 7) run automatically

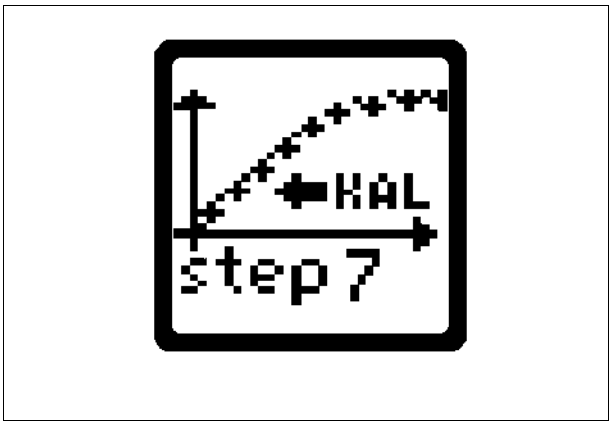


Fig. 166. I000556

If calibration completes successfully, the image is displayed and the new sensor values are saved

Press "ESC" to confirm

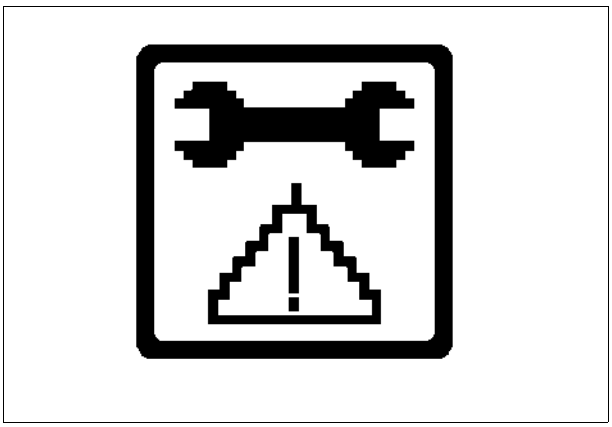


Fig. 167. I000558

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

NOTE: *Settings are only transferred when the ignition key has been turned to "0" position.*
(Wait for at least 15 seconds before switching on the ignition again!)

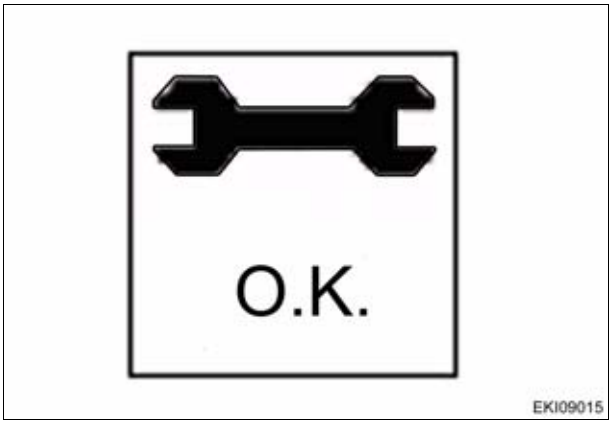


Fig. 168. I003578

If incorrect values are detected or the conditions are not met, an message appears**ERROR**

If incorrect values are detected or the conditions are not met, a fault code is displayed, F1 ... F15

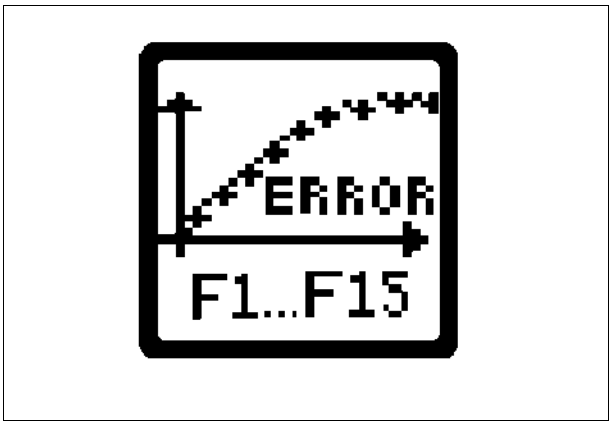


Fig. 169. I000557

Possible fault codes with transmission ratio calibration code 4007

Fault code	Cause
F 1	Preliminary conditions not satisfied
F 2	1. The A050 basic control unit is not released immediately when the ignition is switched off. Approx. 15 seconds will lapse from the ignition being switched off to the release of the A050 basic control unit 2. Check connectors to the A009 actuator unit.
F 3	A009 actuator unit does not actuate the precise setpoint value. Check that the transmission control runs smoothly, e.g. engage and check emergency operation.
F 4	Transmission ratio adjustment not effected within 8 sec. Check that the transmission control runs smoothly, e.g. engage and check emergency operation.
F 5	Step 1: A009 actuator unit does not find neutral point 0 in forwards direction. Step 2: A009 actuator unit does not find neutral point 0 in reverse direction. Check A009 actuator unit to actuator shaft connection.
F 6	See error message F 5
F 7	Step 2: neutral points of transmission control for forward and reverse movement are too far apart, greater than 8°. Check A009 actuator unit to actuator shaft connection.
F 8	Step 3: max. transmission ratio forward point not found. Min. setpoint value 155°, max. 187°. Step 4: max. transmission ratio reverse point not found. Min. setpoint value 136°, max. 165°. Check A009 actuator unit to actuator shaft connection.
F 9	Step 3: forward actuator shaft adjustment greater than 155°, but transmission adjustment reacts less than 155°. Step 4: reverse actuator shaft adjustment greater than 135°, but transmission adjustment reacts less than 135°. Check A009 actuator unit to actuator shaft connection. Actuator unit.

Fault code	Cause
F 10	Transmission ratio characteristic not logical, e.g. shifted forward and reverse detected. Repeat calibration. See also error message F 2. Check rotational direction signal from B014 hydrostatic sensor (collecting shaft)
F 11/F 12	Step 7: check Step 1 to Step 6 values. ML transmission ratio not OK. Repeat calibration. See also error message F 2. Then check hydrostatic power branch, e.g. via emergency operation.
F 13	1. EOL programmed incorrectly (prior to Step 1) 2. Values stored in A050 basic control unit not logical. Remedy: 1. Reprogram EOL. 2. See 1. Replace A050 basic control unit where necessary.
F 14	See F 11/F 12
F 15	1. Maximum forward and/or reverse transmission ratio not achieved. 2. Y005 speed governor solenoid valve (30 km/h) not OK Remedy: 1. Repeat calibration (see also F2). Then check hydraulic power distribution system if necessary, e.g. via emergency operation. 2. Y005 speed governor solenoid valve

The fault code is displayed from end-of-line program (EOL) 7.60 onward (as of autumn 2007)

If incorrect values are detected or the conditions are not met, an **ERROR** message is displayed.
4007 = calibration code
FXX = fault code

Fig. 170. I003585

Fault code	Cause
F02	A009 actuator unit reports a fault Frequent cause of fault: During previous fault-generated calibration exit, no "Key reset (ignition OFF/ON)" was carried out
F03	A009 actuator unit does not actuate the precise setpoint value. Check that the transmission control runs smoothly, e.g. engage and check emergency operation.
F04	Transmission ratio adjustment not effected within 8 sec. Check that the transmission control runs smoothly, e.g. engage and check emergency operation.
F05	Step 1: A009 actuator unit does not find neutral point 0 in forwards direction. Step 2: A009 actuator unit does not find neutral point 0 in reverse direction. Check A009 actuator unit to actuator shaft connection.
F06	See under error message F05
F07	Step 2: neutral points of transmission control for forward and reverse movement are too far apart, greater than 8°. Check A009 actuator unit to actuator shaft connection.
F08	Step 3: Max. transmission ratio forward point not found. Specified value min. 155°, max. 187° Step 4: Max. transmission ratio reverse point not found. Specified value min. 136°, max. 165°. Check A009 actuator unit to actuator shaft connection.

Fault code	Cause
F09	Step 3: forward actuator shaft adjustment greater than 155°, but transmission adjustment reacts less than 155°. Step 4: reverse actuator shaft adjustment greater than 135°, but transmission adjustment reacts less than 135°. Check A009 actuator unit to actuator shaft connection. Actuator unit.
F10	Transmission ratio characteristic not logical, e.g. shifted forward and reverse detected. Repeat calibration. See also error message F 2. Check rotational direction signal from B014 hydrostatic sensor (collecting shaft)
F11/F12	Step 7: check Step 1 to Step 6 values. ML transmission ratio not OK. Repeat calibration. See also error message F 2. Then check hydrostatic power branch, e.g. via emergency operation.
F13	1. EOL programmed incorrectly (prior to Step 1) 2. Values stored in A050 basic control unit not logical. Remedy: 1. Reprogram EOL. 2. See 1. Replace A050 basic control unit where necessary.
F14	See F 11/F 12
F15	1. Maximum forward and/or reverse transmission ratio not achieved. 2. Y005 speed governor solenoid valve (30 km/h) not OK Remedy: 1. Repeat calibration (see also F2). Then check hydraulic power distribution system if necessary, e.g. via emergency operation. 2. Y005 speed governor solenoid valve
F50	User interrupted with ESC
F51	Speed above 0.1 km/h
F52	Engine speed below 1400 rpm
F53	Handbrake not applied
F54	Faulty speed signal from B015 bevel pinion speed sensor
F55	Faulty speed signal from B014 hydrostatic collector shaft sensor
F56	Faulty speed signal from B010 engine speed sensor
F57	Clutch pedal depressed
F58	B017 clutch pedal sensor faulty
F59	Travel range I key pressed (A039 multifunction armrest)
F60	Travel range I key faulty (A039 multifunction armrest)
F61	Travel range II key pressed (A039 multifunction armrest)
F62	Travel range I key faulty (A039 multifunction armrest)
F63	Range control I/II is not in neutral - Range selector in neutral (normal after calibration of the travel range selector (code 4003)) - Manually set the transmission to neutral via the emergency operation if necessary
F64	Y005 speed governor solenoid valve electrical fault

Graphic overview of transmission ratio calibration

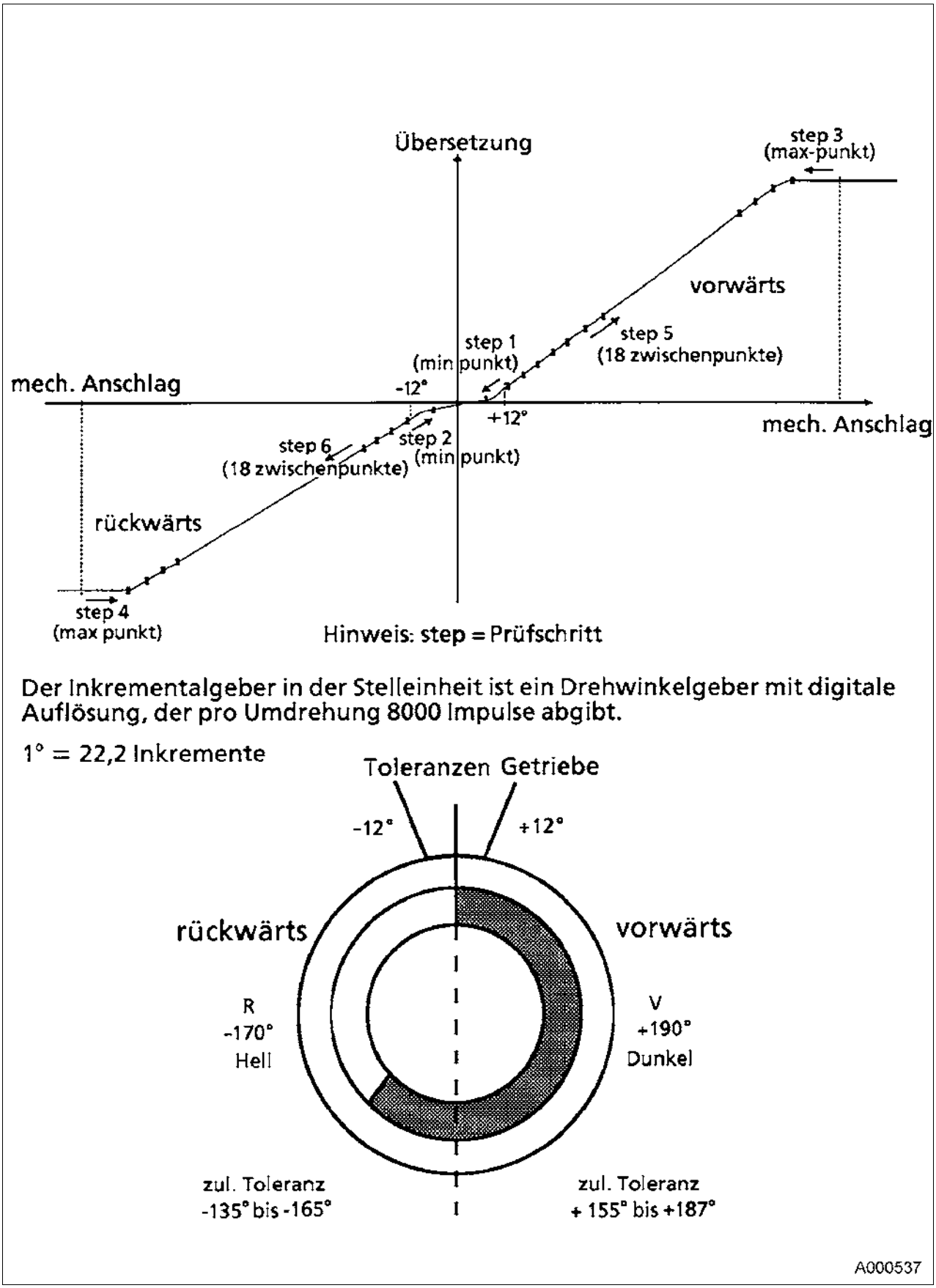


Fig. 171.

I001031

16 Calibration code 4009 (turbo-clutch function)

17. Calibrating the turbo-clutch function (4009)

Important: The following preparatory steps must be carried out.

- Transmission oil temperature approx. 40°C
- Start engine
- Engage transmission travel range II via the switch in the A039 multifunction armrest
- Hand brake applied. Caution: the tractor may set in motion during the calibration operation
- Tractor stationary (below 0.01 km/h)
- Engine speed 1100 rpm +/- 40
- Engine speed drops to approx. 800 rpm during the calibration operation
- If fault messages are displayed, the faults must be confirmed one by one.

Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel

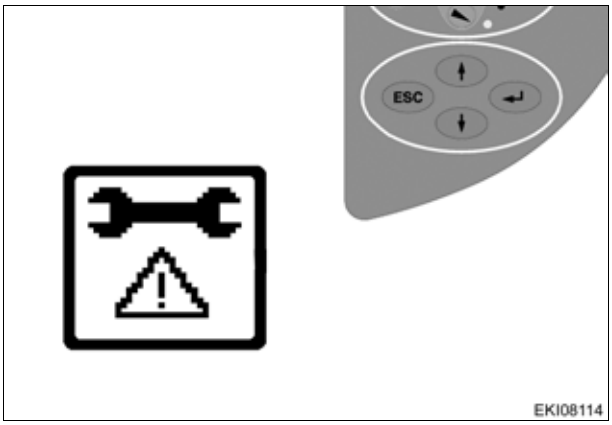
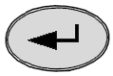
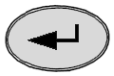


Fig. 172. I000760



Press "Return", the first main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return", the second main menu appears in the multiple display

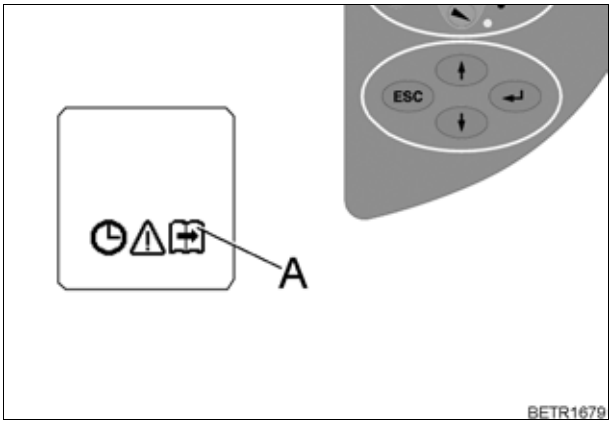
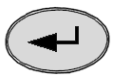


Fig. 173. I000761

The second main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return" to confirm

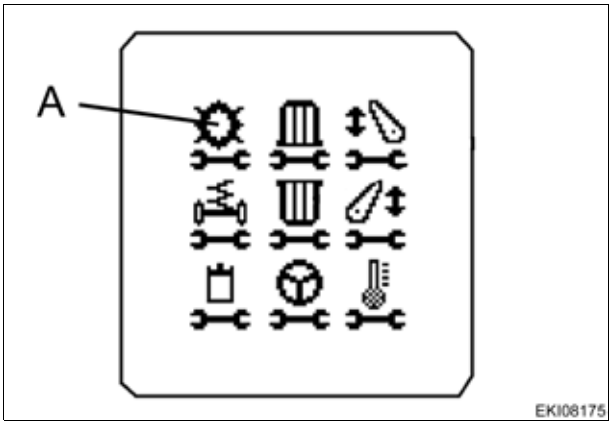
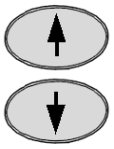


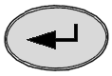
Fig. 174. I000988

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-

The transmission menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return" to confirm

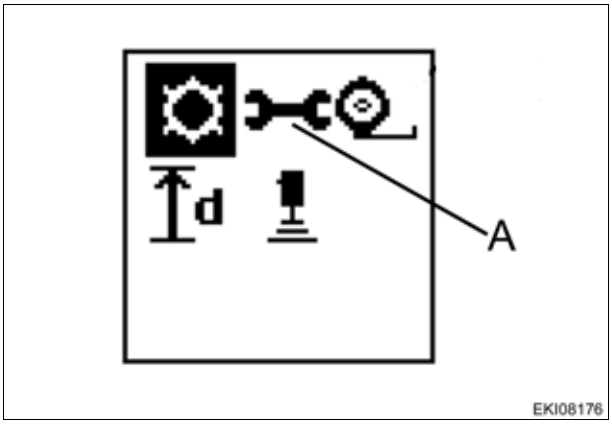
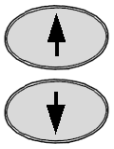


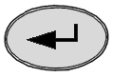
Fig. 175. I000989

Input code **4009**



Press one of the buttons until the required number is displayed

Press "Return" to confirm



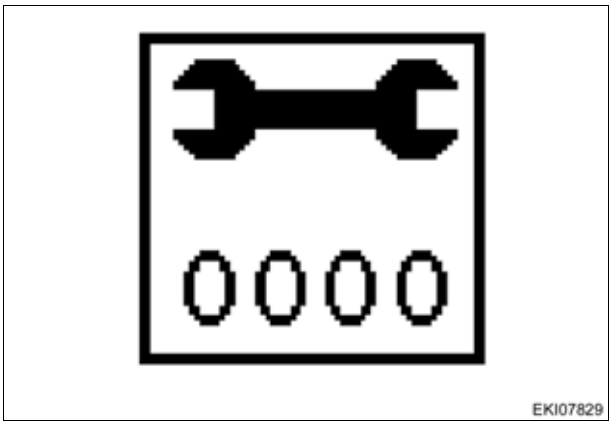


Fig. 176. I000773

Calibration will continue automatically

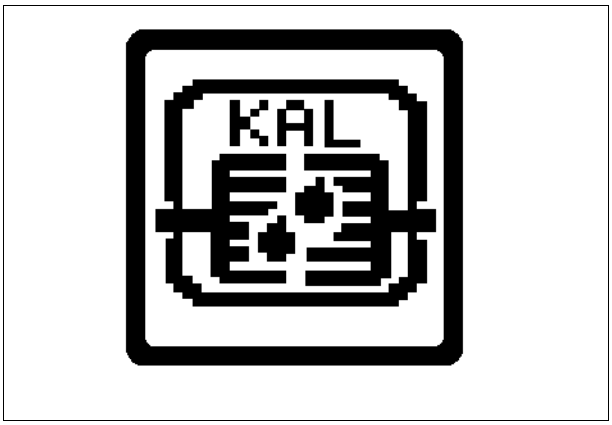


Fig. 177. I000550

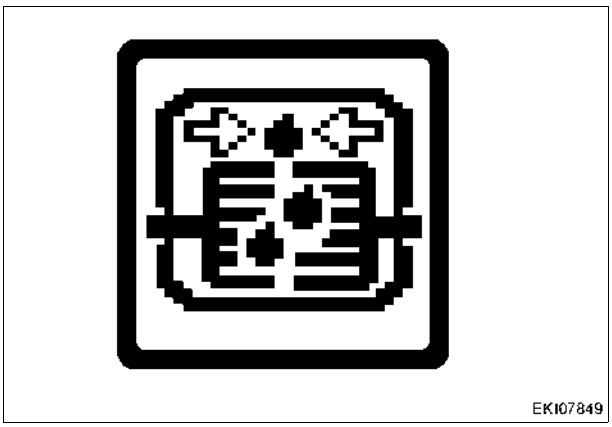


Fig. 178. I001033

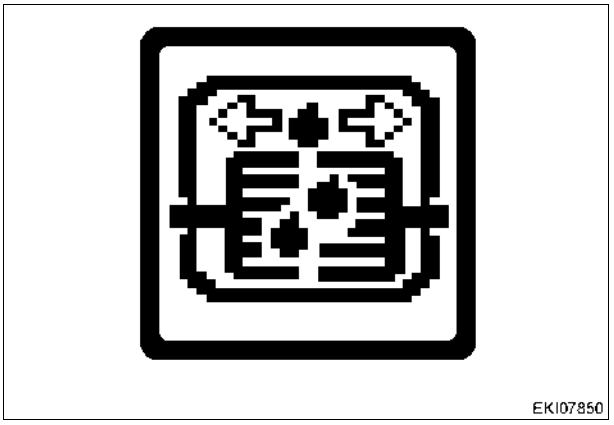


Fig. 179. I001034

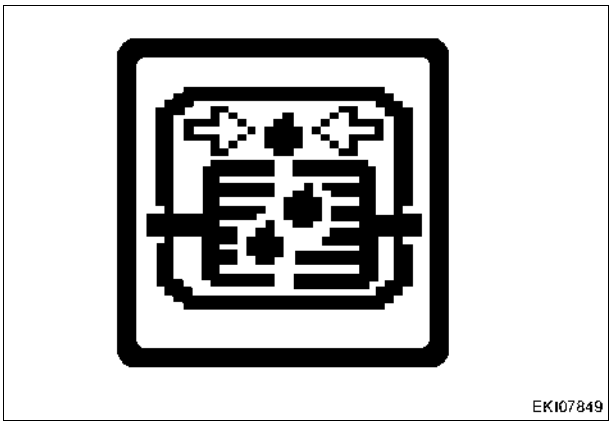


Fig. 180. I001033

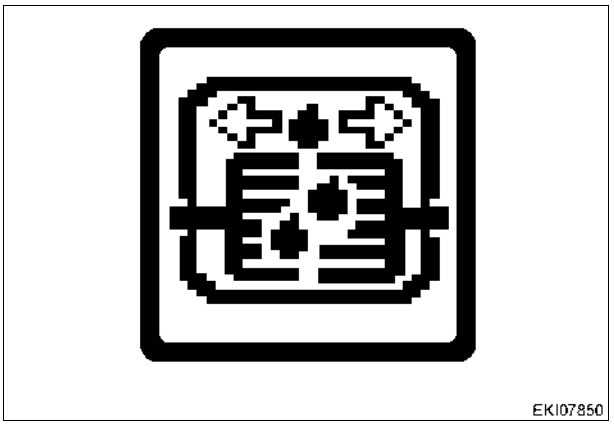


Fig. 181. I001034

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

NOTE: *Settings are only transferred when the ignition key has been turned to "0" position.*
(Wait for at least 15 seconds before switching on the ignition again!)

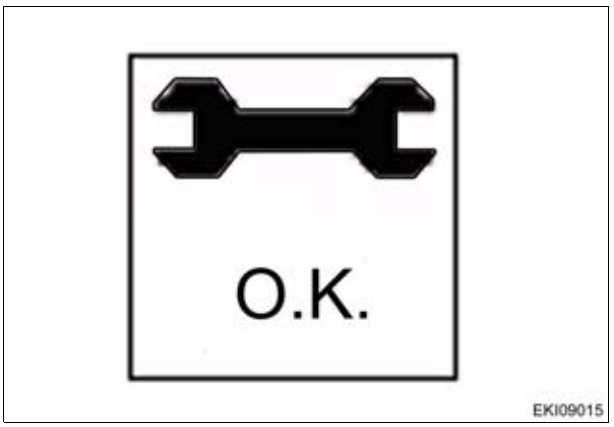


Fig. 182. I003578

If incorrect values are detected or the conditions are not met, an message appears**ERROR**

4009 = calibration code
FXX = fault code

NOTE: *The fault code is displayed from end-of-line program (EOL) 7.60 onward (Autumn 2007)*

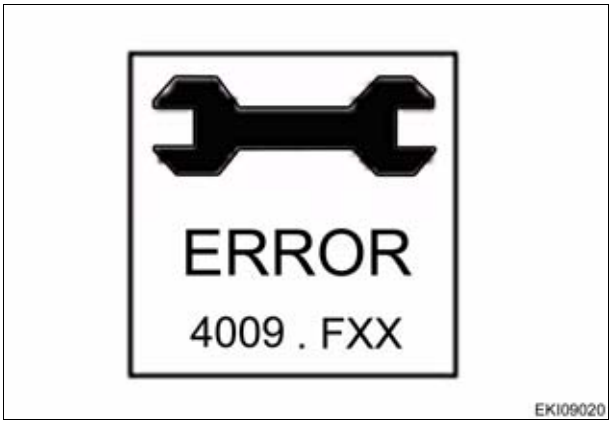


Fig. 183. I003586

Fault code	Cause
F01	User terminated calibration with ESC
F02	Calibration in emergency mode not possible
F03	Error while saving calibrated values
F04	Speed above 0.1 km/h
F05	Engine speed too low when starting calibration Nominal engine speed = 1100 +/- 40 rpm
F06	Engine speed too low during calibration Nominal engine speed = 1100 +/- 400 rpm
F07	B010 engine speed sensor faulty
F08	Driving range II not engaged
F09	B016 driving range detection sensor faulty
F10	Transmission not in neutral
F11	Neutral button faulty (A039 multifunction armrest)
F12	Clutch pedal depressed
F13	B017 clutch pedal sensor faulty
F14	Transmission pressure too high when starting calibration (above 100 bar)
F15	Transmission pressure too high when starting calibration (above 200 bar)
F16	B008 high pressure sensor 1 faulty
F17	S080 hand brake switch faulty
F18	Handbrake not applied
F19	Fault in A009 actuator unit
F20	Fault in Y004 turbo clutch/transmission neutral solenoid valve
F21	Plausibility error: Power consumption of Y004 turbo clutch/transmission neutral solenoid valve to transmission high pressure
F22	Error in transmission ratio
F23	Plausibility error: Power consumption of Y004 turbo clutch/transmission neutral solenoid valve e.g. short-circuit in Y004 solenoid valve

17 Calibration code 4010 (throttle pedal resolution)

18. Calibrating the throttle pedal resolution (4010)

Important: The following preparatory steps must be carried out.

– Hand brake applied

– Ignition ON

– If fault messages are displayed, the faults must be confirmed one by one.

Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel

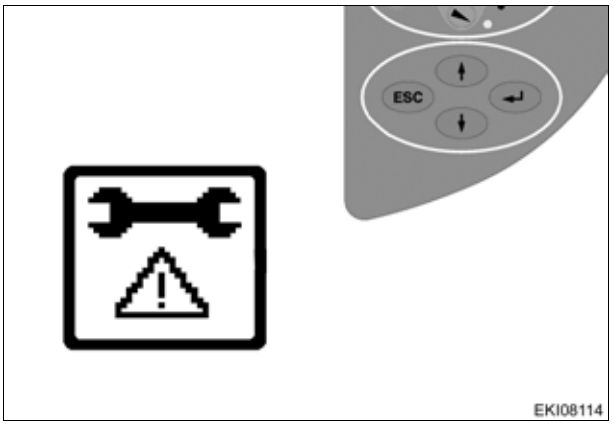
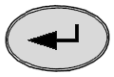


Fig. 184. I000760



Press "Return", the first main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes

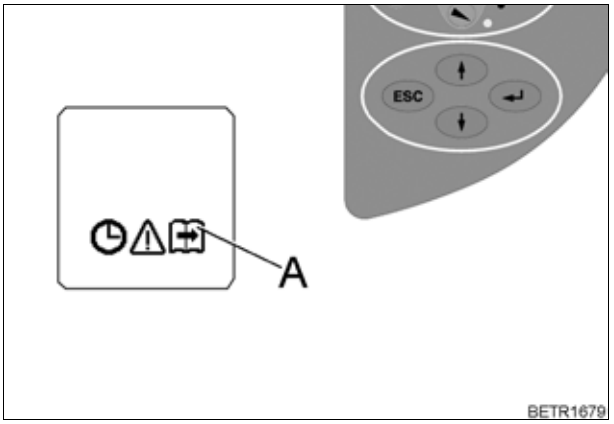
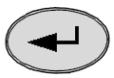


Fig. 185. I000761



Press "Return", the second main menu appears in the multiple display

The second main menu appears in the multiple display

Press one of the buttons repeatedly until the symbol (A) flashes

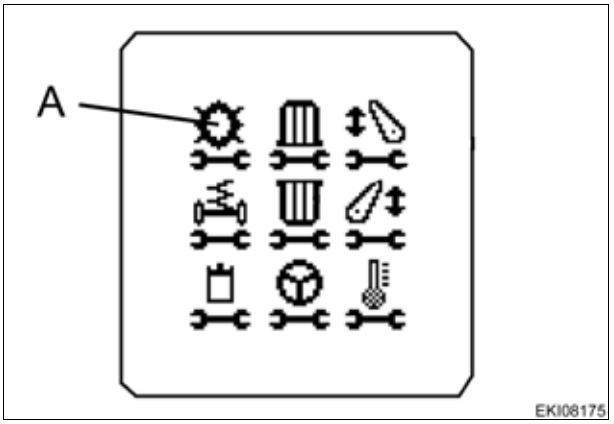
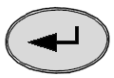
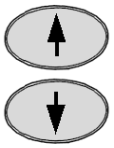


Fig. 186. I000988



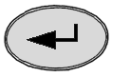
Press "Return" to confirm

The transmission menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes

Press "Return" to confirm



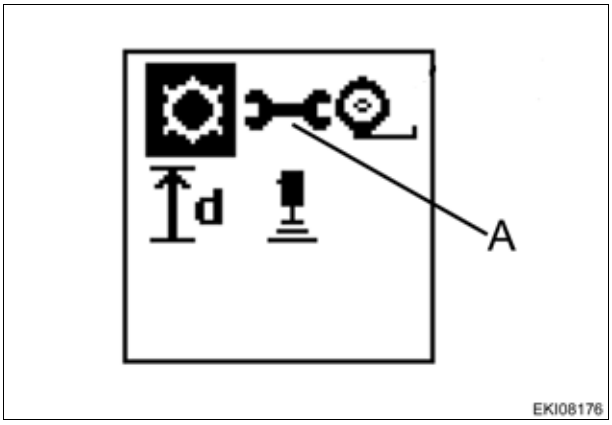
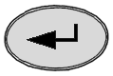


Fig. 187. I000989

Input code **4010**

Press one of buttons until desired number is displayed

Press "Return" to confirm



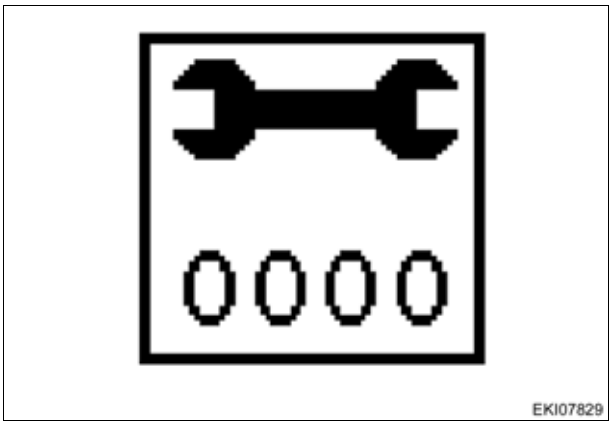
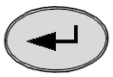


Fig. 188. I000773

Set "throttle pedal resolution" sliding switch to maximum

Press "Return" to confirm



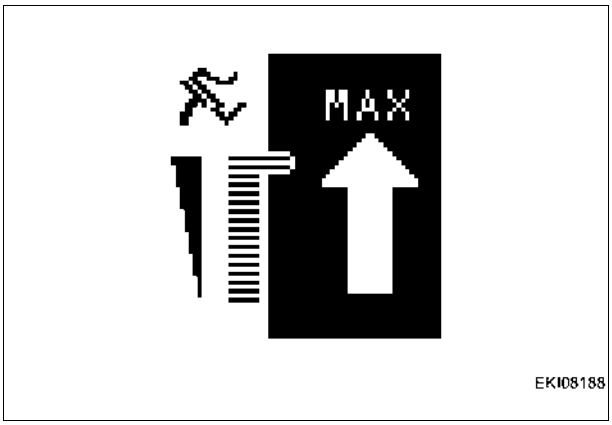
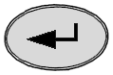


Fig. 189. I001042

Set "throttle pedal resolution" sliding switch to minimum

Press "Return" to confirm



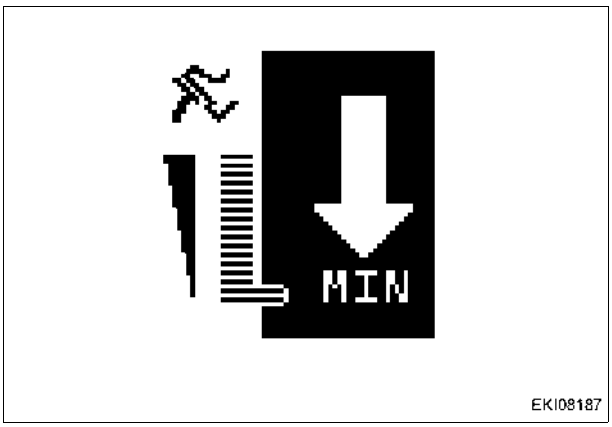


Fig. 190. I001040

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

NOTE: *Settings are only transferred when ignition key has been turned to "0" position.*
(Wait for at least 15 seconds before switching on the ignition again!)

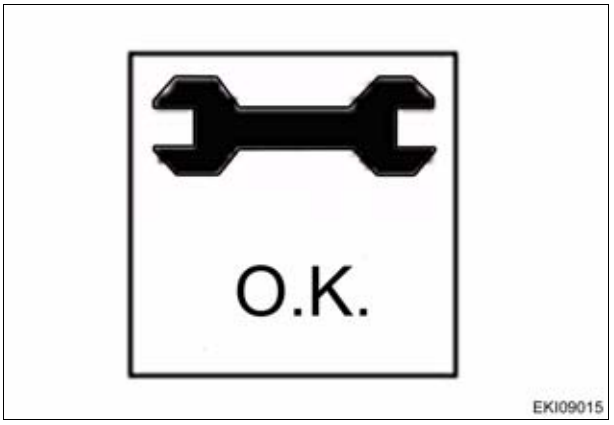


Fig. 191. I003578

If incorrect values are detected or the conditions are not met, an message appears**ERROR**

4010 = calibration code
FXX = fault code

NOTE: *The fault code is displayed from end-of-line program (EOL) 7.60 onward (as of autumn 2007)*

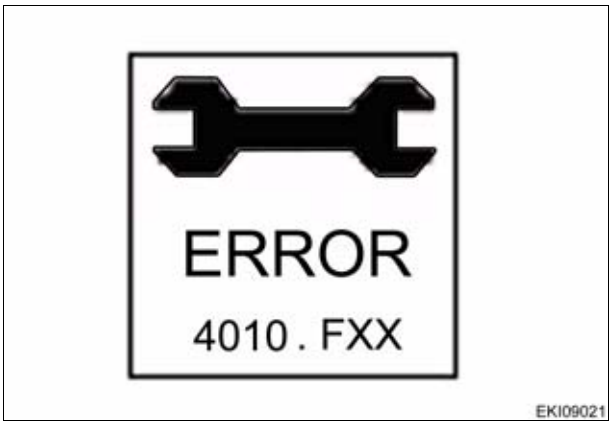


Fig. 192. I003590

Fault code	Cause
F02	Calibrated value of the current actuator position is invalid
F03	A039 multifunction armrest is not responding
F08	Calibration lasting too long (longer than 30 seconds)
F09	User terminated calibration with ESC

18 Calibrating the heater valve (no code)

19. Calibrating the heater valve (no code)

Important: The following preparatory steps must be carried out.

– Ignition ON

– Diesel engine running

Press "ESC" to confirm the warning and fault messages displayed on the A007 instrument panel

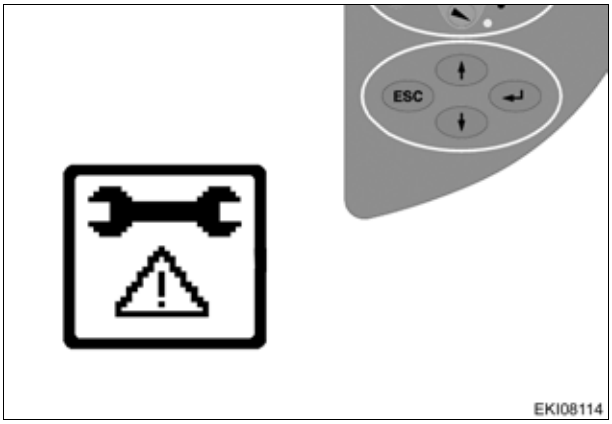
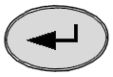
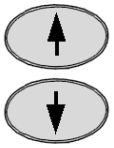


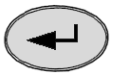
Fig. 193. I000760



Press "Return", the first main menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return", the second main menu appears in the multiple display

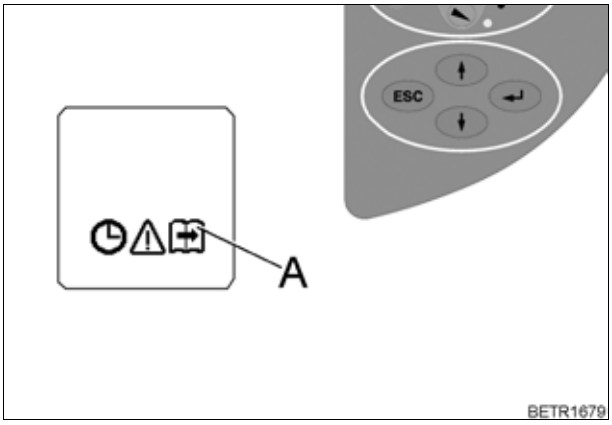
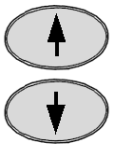
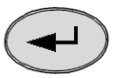


Fig. 194. I000761

The second main menu appears in the multiple display



Press one of the buttons repeatedly until the symbol (A) flashes



Press "Return" to confirm

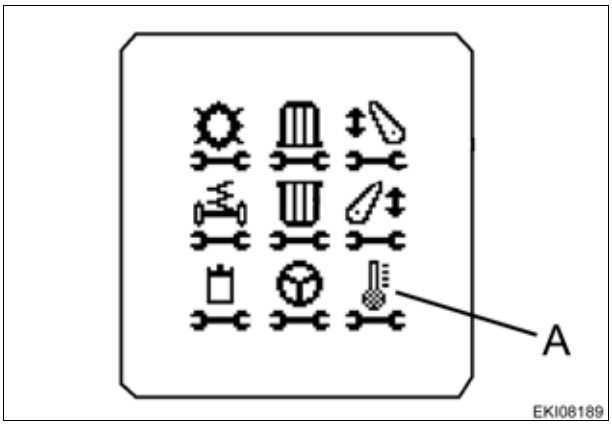


Fig. 195. I001046

The calibration process is automatic (approx. 30 seconds)

The heater valve stepper motor is opened and closed slowly

NOTE: *The display flashes during the calibration process*

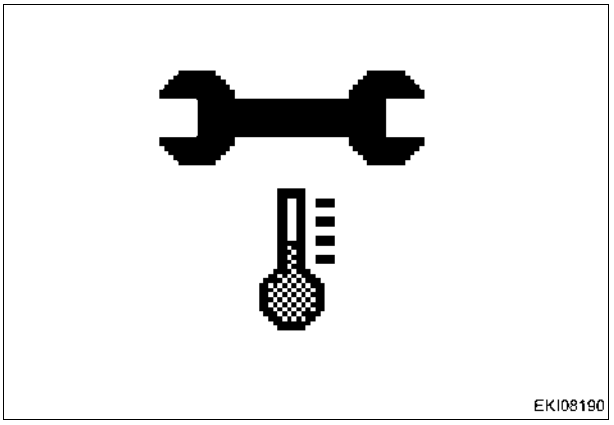


Fig. 196. I001047

If incorrect values are detected or the conditions are not met, an message appears**ERROR**

If calibration is completed without errors, **O.K.** appears and the new sensor settings are saved.

NOTE: *Settings are only transferred when ignition key has been turned to "0" position.*
(Wait for at least 15 seconds before switching on the ignition again!)

19 Calibrating the speed display (A007 instrument panel and A011 radar sensor)

Calibrating speed display

– Transmission signals (actual tyre circumference) **"theoretical speed"**

– A011 radar sensor **"actual speed"** (from EOL 7.60/Nov. 07)

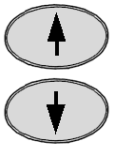
Preliminary conditions:

– Accurately measure and mark out a track of 30 m (min.) and 100 m (max.).

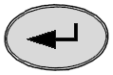
– Position the tractor, e.g. with its front wheels, precisely on the start mark (stop with clutch)

NOTE: *We recommend:*
Choose the longest possible track (100 m)
Carry out the calibration on a dry and level surface

The calibration is carried out in the transmission menu



Press one of the buttons repeatedly until the symbol (A) flashes



Press the "Enter" key, the following screen is displayed.

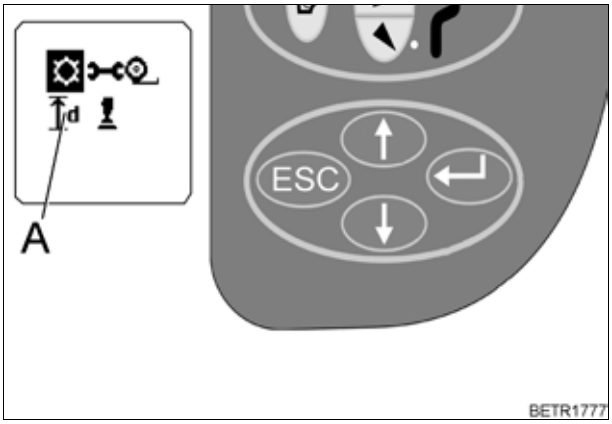
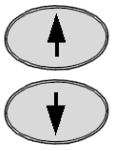
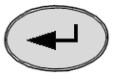


Fig. 197. I002923

The first digit for the track information flashes.
The measured track length for the track information must now be entered.
E.g. 100 m



Repeatedly press one of the keys repeatedly until the desired figure shows. E.g. 1



Press "Enter" to confirm. Enter the remaining two positions in the same manner.

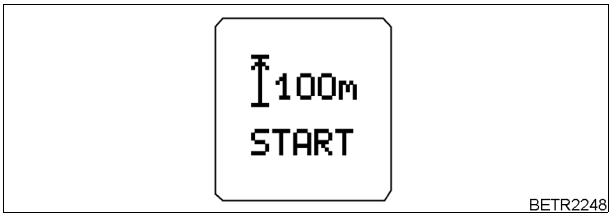
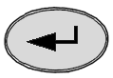


Fig. 198. I002924

After confirming the last digit, "START" will flash.



Press the key, the display changes from "START" to "STOP".

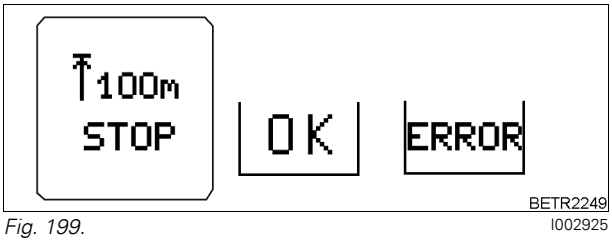
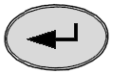


Fig. 199. I002925

Drive off with the tractor and stop with the front wheel on the end marker of the measured distance (stop with clutch).



Press "Enter" to confirm.

If incorrect values are detected or the conditions are not met, an **ERROR** message appears

If the calibration has run correctly the message **OK** is displayed and the new tyre circumference and the radar impulses are saved.

Using the "ESC" key, work back until Time and Operating Hours are displayed

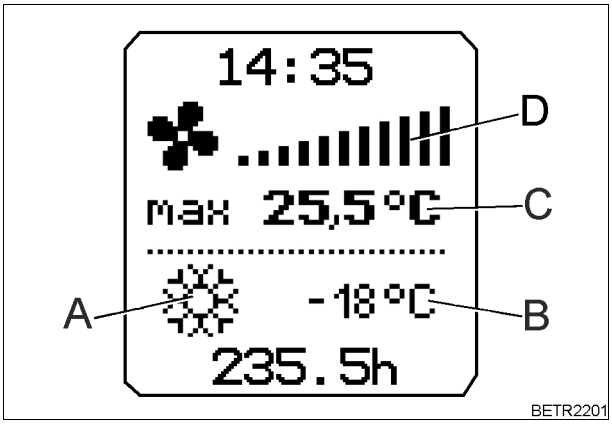


Fig. 200. I002926

NOTE: *Transfer of tyre circumference and radar impulses only takes place when the ignition key is set to the "0" position. (Wait for at least 15 seconds before switching on the ignition again!)*

ERROR messages	Cause
F01	**Calculated tyre circumference is too small** (e.g. clearly greater distance travelled than input)
F02	**Calculated tyre circumference is too large** (slightly less distance travelled than input e.g. at 100 m calibrated as 95 m travelled)
F03	**Radar impulse total is clearly less than the nominal impulse total** (e.g. obviously less distance travelled than input)
F04	**Radar impulse total is clearly greater than the nominal impulse total** (e.g. clearly greater distance travelled than input)
F06	**Calculated values could not be written to the A050-ECU, basic control unit** (write error in EEPROM)

20 Auto-Guide system: calibration of roll bias (DMU) (only with OmniStar HP or basic station)

When operating the Auto-Guide system with the patch:

– **OmniStar HP**

or

– **Basic station (local base)**

the DMU (gyro compass) roll bias must be calibrated.

NOTE: *When operating the Auto-Guide system with the OmniStar VBS patch, calibration of the roll bias is not necessary.*

Fig. 201. I003371

DMU (gyro compass)

The **DMU (gyro compass)** is built into the A058 Auto-Guide TopDock

Fig. 202. I002355

Description

In addition to GPS navigation, the Auto-Guide system also includes a dynamic measurement unit **DMU (gyro compass)**. The sensors inside the DMU measure angular rates and acceleration, in order to determine the precise orientation of the vehicle (over 70 times a second).
This enables the Auto-Guide system to measure roll, pitch and yaw of the tractor very precisely and can guide the tractor very accurately along the path.
The DMU (gyro compass) has been especially developed for vehicles that are subject to vibrations.
The DMU (gyro compass) does not have any moving parts

Calibrating for roll bias

Roll bias calibration must be carried out under the following circumstances:

– When using the OmniStar HP patch
– When using a basic station
– Following fitment of the Auto-Guide system into the tractor (after ordering and commissioning of the patch)
– Periodically (at the beginning of the season, or on a monthly basis)
– When the A058 Auto-Guide TopDock is transferred to another tractor
– If the Auto-Guide system has been inactive for a long period
– When the DMU (gyro compass) is replaced

Conditions for roll bias calibration

– Scroll with the **arrow key**

Fig. 203. I003307

– Switch to the status indicator with the **measuring gauges**

Fig. 204. I003308

Press **DETAILS** in the "Status" screen

Fig. 205. I003311

The accuracy of the GPS positioning can be viewed on the "GPS Details" page.
The **Accuracy** value shows an estimate of the difference between the position determined by the GPS satellites and the actual position of the tractor (static accuracy).
The longer the Auto-Guide system is operating, the more accurate it becomes.

To calibrate the DMU "gyro compass" an accuracy of at least 0.5 m must be available.

NOTE: *See also:*
Chapter 0000 Reg. E Reading out Auto-Guide system information "Details".

Fig. 206. I003339

Perform calibrating roll bias without mounted implement

Set the following parameters on the A059 Auto-Guide terminal:
Implement width = 10 m
Implement offset = 0 m
Way line offset = 0 m

On flat, reasonably level ground, align the tractor at the start of the wayline.
Move the tractor forwards and switch on the automatic track guide.
Maintain a speed of approx. 7 km/h .
Drive for at least 100 m along the way line.

Turn around at the end of the wayline and align wheels in the same wheel tracks going the opposite direction.
Move the tractor forwards and switch on the automatic track guide.
Maintain a speed of approx. 7 km/h .
Drive for at least 100 m along the way line.

At the end of the second run, turn the tractor around again and align wheels in the same wheel tracks.
Wait at least 30 seconds.
In these 30 seconds the Auto-Guide system performs a mean roll bias calculation.

Procedure

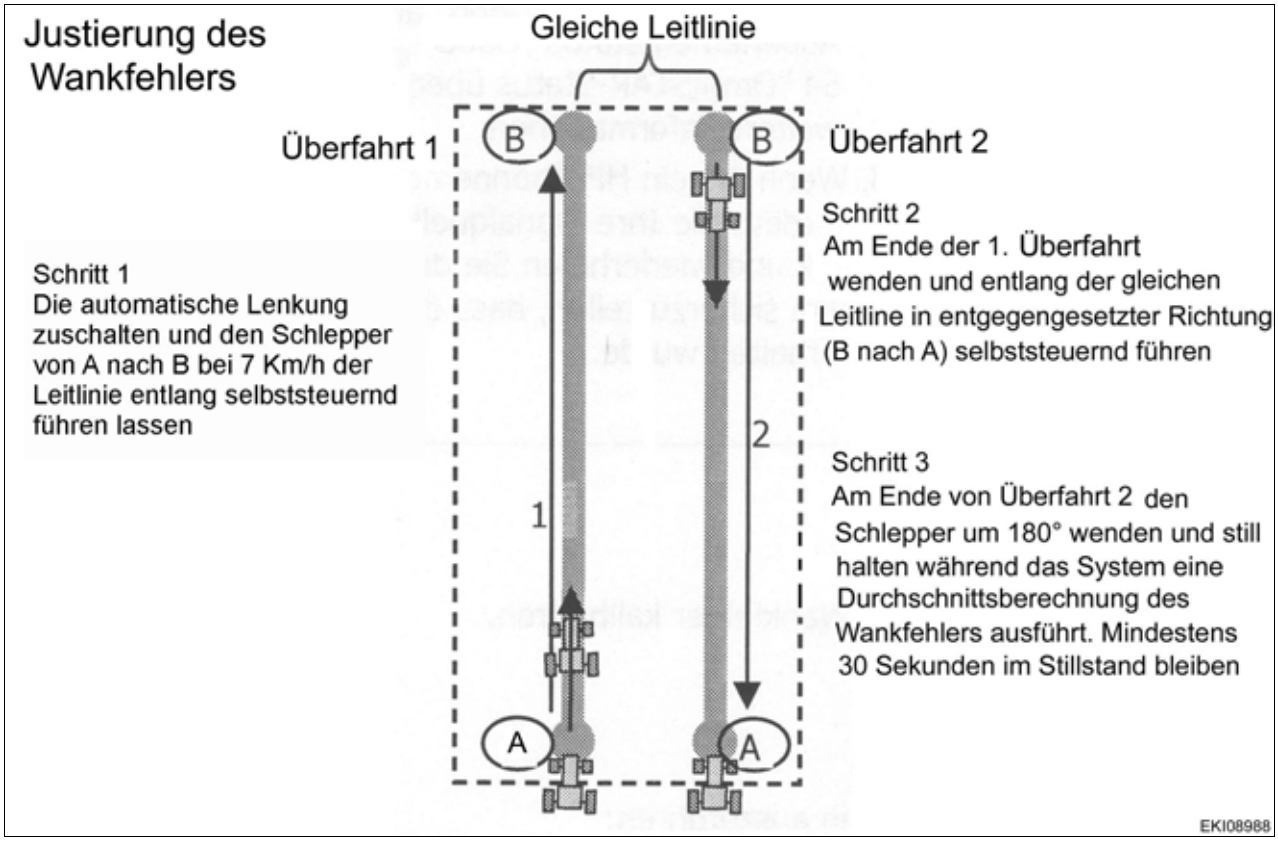


Fig. 207.
I003504

System information from the DMU (gyro compass)

In the Details status screen
Overview with system information **"General Information"**

Roll Bias
If the calibration of the DMU "gyro compass" shows
Value = 0 (DMU not calibrated)
Value = 0 +/-5° (DMU calibrated)

Fig. 208. I003342

In the Details status screen
Overview with system information **"Hardware Details"**

NOTE: *On the "Hardware Details" screen there is further information about the DMU (gyro compass)*

Scroll with the arrow keys

Fig. 209. I003341

Hardware Details		
Detail	**Description**	**Note**
DMU Type	**Type of DMU** (gyro compass) in A058 Top-Dock.	Example: Six Axis (6 axis compass)
DMU S/No	**Serial number of DMU** (gyro compass)	Example: 060 1000021
DMU Pkts/Sec.	The total number of readings sent by the DMU per second to the A058 Auto-Guide Top-Dock (ECU, GPS).	**70 messages per second** or more indicates "good operation"

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

1005

Overall system/transmission

1005 Overall system/transmission

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A General

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1 Transmission control system functional sequence

Transmission type ML 260
M – Marschall, designer of this development
L – Power distribution, mechanical and hydrostatic power transmission
260 – Vario transmission size

ML 260 transmission
The ML 260 is a continuously variable transmission for forward and reverse travel.
Power transmission can be hydrostatic or mechanical, or hydrostatic and mechanical.
Basically this means:
Slow forward travel = high hydrostatic transmission power/low mechanical transmission power
Fast forward travel = low hydrostatic transmission power/high mechanical transmission power
For a detailed explanation, see transmission function plan

Hydrostatic power distribution
The ML transmission unit is flexibly mounted in the transmission housing. The transmission housing is also the oil reservoir for the hydrostatic drive.
Oil fill: Fendt Extra Trans 10W-40 or STOU oil, viscosity SAE 10W-40 or 15W-40
Initial fill: approx. 87 l
Refill: approx. 67 l, e.g. at oil change
Functional sequence, see transmission hydraulic circuit diagram
The servo pump draws in oil through the suction filter.
The temperature sensor (B009) monitors the temperature of the transmission oil.
Flow through the oil cooler is temperature-dependent.
This means that if the transmission oil is cold, little oil flows through the oil cooler, while most flows through the bypass valve. The bypass valve opens when the differential pressure exceeds approx. 3,5 bar. The transmission oil temperature is monitored by the temperature sensor.
The servo pump generates the system pressure for the ML control valves and enhanced control valves. The system pressure of approx. 25 bar is restricted by the pressure-limiting valve and restrictor orifice.

The system uses three different pressures.
1. System pressure for ML transmission control, approx. 25 bar
2. Enhanced control pressure for the rear PTO clutch, rear PTO shaft control, differential lock and 4WD switchover. Enhanced control pressure approx. 18 bar
3. High pressure in ML transmission max. 550 bar + 15 bar

Pressure filter contamination is monitored by a pressure switch (S017) as a function of the transmission oil temperature. Filter contamination is not monitored if the transmission oil temperature is below 50°.
Two non-return valves (2V1 and 2V2) alternately feed cooled transmission oil into the high-pressure circuit.
Hot transmission oil is discharged from the high-pressure circuit via the purge valve (2V5).
The high-pressure circuit incorporates: a variable-displacement pump (2P1), two variable-displacement motors (2A1), two non-return valves (2V1 and 2V2), two servo-assisted high-pressure limiting valves (2V3 and 2V4), a purge valve (2V5), a clutch pressure-limiting valve (4V4), a turbo-clutch pressure-limiting valve (4V5) and a test connection (PH).
The variable-displacement cylinders (3A1 and 3A2) on the variable-displacement pump and motor are actuated by two 4/3-directional control valves (3V1 and 3V2).
The 4/3 directional control valves are mechanically actuated by the actuator shaft (3Z1).
The actuator shaft (3Z1) is rotated as required by the actuator unit (A009), thereby setting the correct quantity of oil to be supplied or consumed.
The variable-displacement pump (2P1) and the two variable-displacement motors (2A1) swivel correspondingly.
In the emergency mode switch position, the actuator shaft (3Z1) is actuated manually from the cab. *see §2*
In the emergency mode switch position, the transmission is automatically locked at approx. 30 km/h after the engine has been started.
If the clutch pedal, hand brake or neutral switch is operated, the high-pressure circuit is depressurised by the two high-pressure limiting valves (2V3 and 2V4).
The clutch function is controlled by pressure-limiting valve (4V4), the turbo-clutch function by pressure-limiting valve (4V5).
Important note on filling the ML 260 transmission with oil:
During normal maintenance work, e.g. for a transmission oil change, the transmission oil should be added as in a normal change-gear transmission.
If there is no oil in the high-pressure circuit, the transmission must be filled from an external pressurised filling unit.
During filling, the transmission oil is additionally filtered through connection PU (measuring point M5).
If the oil pressure filling is not performed, the variable-displacement pump (2P1) and variable-displacement motor (2A1) may become damaged as a result of dry running.
Electrical/electronic control

The CAN bus is a data line and connects various components (also called users) with each other. If a large amount of data is transmitted, the voltage in the CAN bus (+ and - cables) rises.
In the Vario 900, data is transmitted via 4 CAN buses.

G bus - transmission bus
K bus - control bus
V bus - valve bus
ISO bus - For attaching ISO implements

The voltage can be checked at the CAN bus sockets (see Chapter 9000):
The actuator unit (A009) controls the actuator shaft, thereby changing the transmission ratio in the ML transmission.
The actuator unit (A009) comprises:

1. Drive for Emergency mode (required in case of failure of the electronic control system)
2. Clutch for the drive
3. Incremental encoder: a position sensor with digital resolution emitting 8000 pulses per revolution
4. Transmission i = 192:1 (electric motor to actuator shaft)
5. 12 VDC electric motor, 0.4 to 7 amps, actuator unit (A009) no-load speed of 4500 rpm
6. Slip clutch 2.5 to 3.5 Nm, less than 5 Nm at key-operated actuator of emergency control.

Once the ignition is on, the actuator unit (A009) locates the reference point (approximate neutral point between forward and reverse travel)
When the engine has started, the actuator unit (A009) locates the reference point (precise neutral point between forward and reverse travel)
Load limit control (restricting the reduction in engine speed or adaptation to the engine speed)
Example: The engine speed is reduced when a load is applied. The electronics change the transmission ratio towards slow so that the engine speed is not reduced too much.
Load limit control is always enabled once the engine is started. However, the reduction in engine speed can be adjusted from 0 to 30% (see Operator's Manual)
The default setting for load limit control is 14%
Load limit control functions:
The electronics detect the setpoint engine speed from the position of the throttle pedal by means of the analogue position sensor (potentiometer) on the pedal.
Control, setpoint transmission ratio has been reached.
The tractor is placed under load and the engine speed drops.
The load limit control only ever changes the transmission ratio towards slow.
The load limit control is enabled at:
reduction in engine speed of over 180 rpm + set value.

Example:	
Engine speed according to throttle pedal position	2000 rpm
Load limit control setting 10% =	200 rpm
Calculation	
2000 rpm - 180 rpm - 200 rpm =	1620 rpm

This means that the load limit control changes the transmission ratio towards "Slow" from 1620 rpm. Theoretically, the load limit control adjusts the transmission ratio when under load, until ground speed reaches 0.

NOTE: *Since the load limit control only changes the transmission ratio towards slow, it is beneficial to switch on cruise control.*
If the engine speed rises again with cruise control switched on, the transmission ratio is restored to the maximum stored speed.
Control using the load limit control + cruise control can be dampened or accelerated using the accelerator ramp switch on the joystick.

Sensors
Engine Hall sensor (B010) measures the engine speed. If the Hall sensor fails, it is only possible to continue in Emergency mode.
The Hall sensor collecting shaft (B014) and bevel pinion (B015) measure rotational speed and detects the direction of rotation.
High-pressure sensor (B008) transmits the current oil pressure in the high-pressure circuit to the electronic system.
Clutch pedal sensor (B017) electronically monitors clutch pedal travel. Before the clutch is engaged, the transmission ratio is reduced. Starting up in travel range I approx. 5 km/h, starting up in travel range II approx. 10 km/h.

Travel range detection sensor (B016) electronically monitors range control travel.
Temperature sensor (B009) monitors the temperature of the transmission oil. Temperatures above 110°C are logged with a fault code.
Rotary position sensor (B055) electronically monitors the pedal travel of the foot throttle pedal.

Solenoid valve, transmission neutral/turbo-clutch valve (Y004) controls the turbo-clutch function. The high-pressure valves open depending on the engine speed.
Speed governor solenoid valve (Y005) cancels the speed restriction to approx. 30 km/h, when the electronics are operational. Speed governing is cancelled if 800 ± 50 mA is applied to the solenoid.
The filter contamination pressure switch (S017) monitors clogging of the pressure filter on the ML transmission.
Hand brake switch, when the hand brake is applied, the two high-pressure valves open and the two F/R lamps flash. The transmission is switched to neutral.
The joystick is in the multifunction armrest.

2 Transmission function diagram

A **Planetary carrier** (drive from combustion engine)
B **Ring gear** (drive to pump)
C **Planet gear**
D **Sun gear** (drive to collecting shaft)

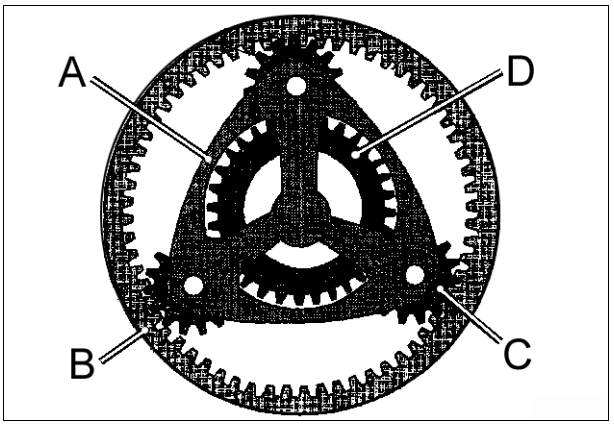

Fig. 1. I001380

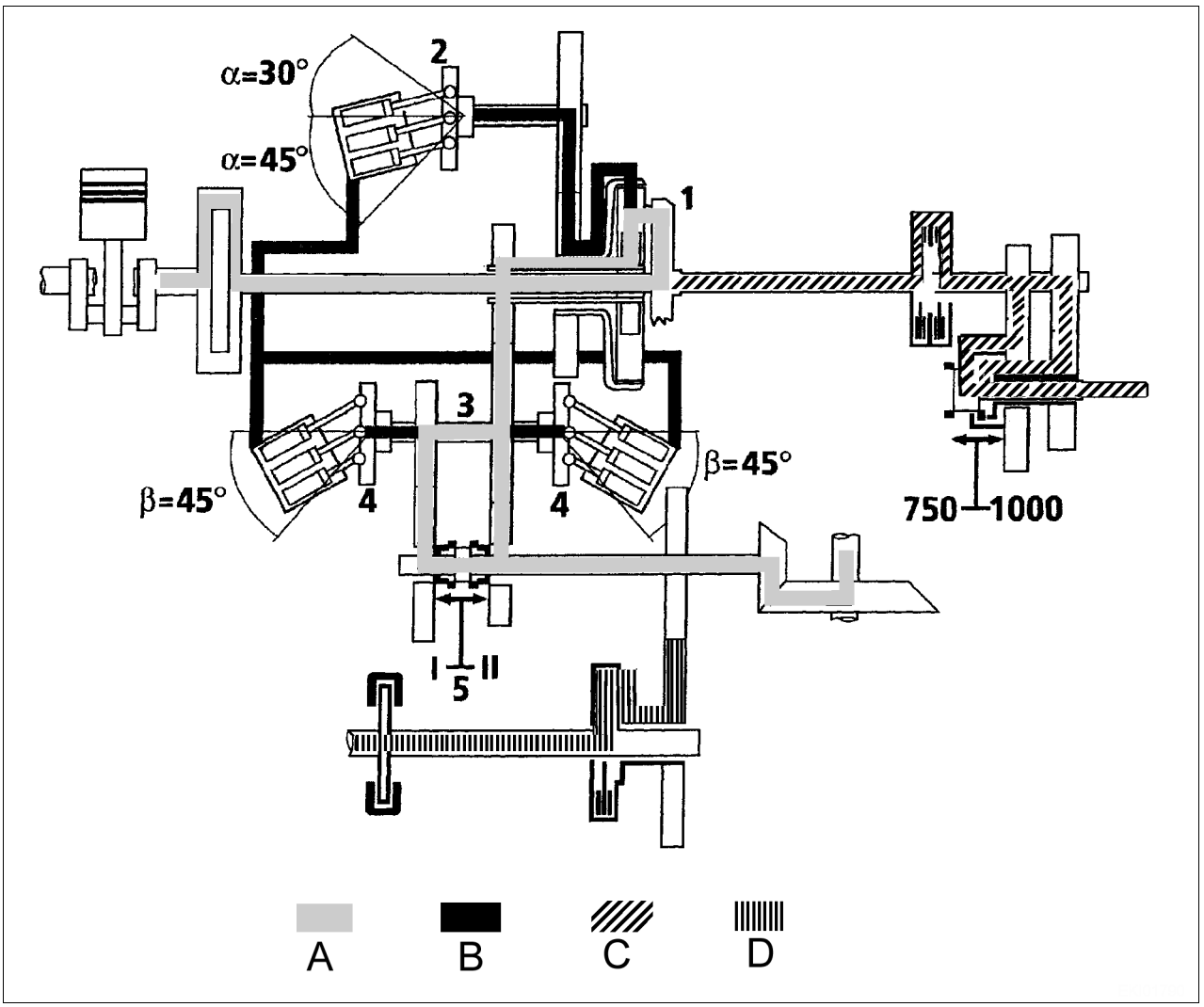

Fig. 2. I001381

A Mechanical power flow	**1** Planetary gear
B Hydrostatic power flow	**2** Hydraulic pump
C PTO drive	**3** Collecting shaft
D 4WD	**4** Hydraulic motor
	5 Range control

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-

Active stationary
Engine running, tractor stationary

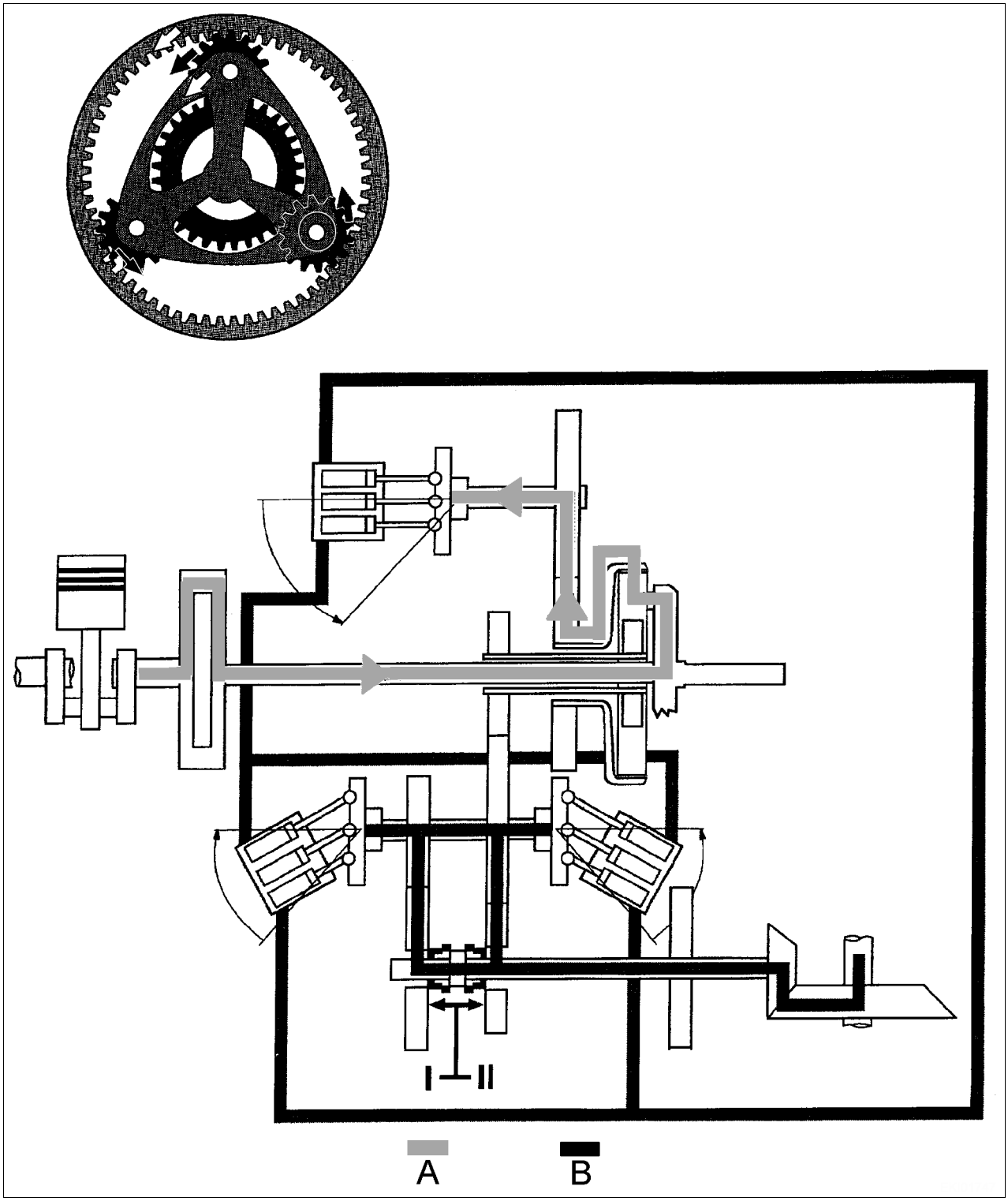

Fig. 3. I001382

A Mechanical power flow	**B** Hydrostatic power flow

Pulling away

99% hydrostatic power transmission

1% mechanical power transmission

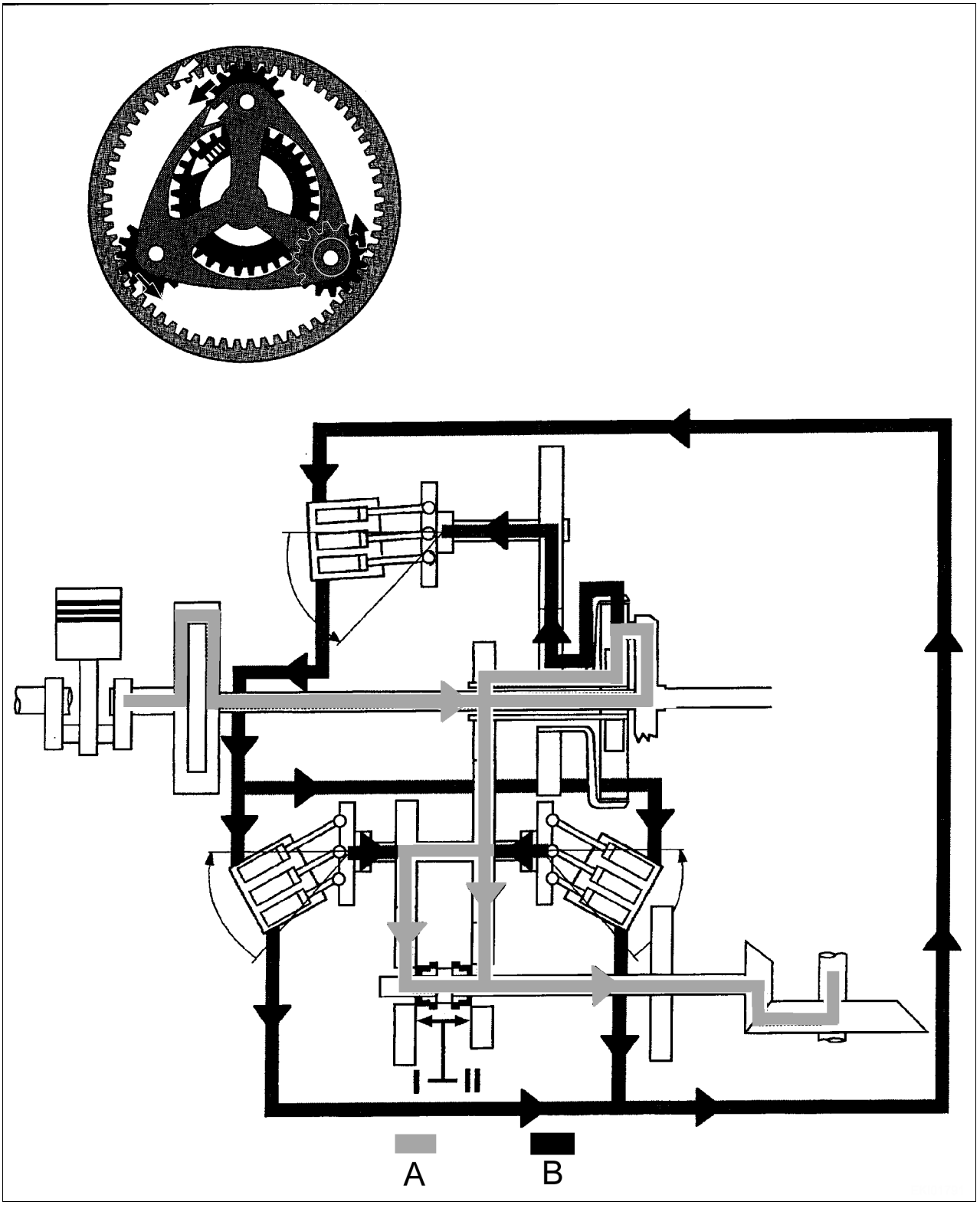

Fig. 4. I001383

A Mechanical power flow	**B** Hydrostatic power flow

Driving, average speed

50% hydrostatic power transmission

50% mechanical power transmission

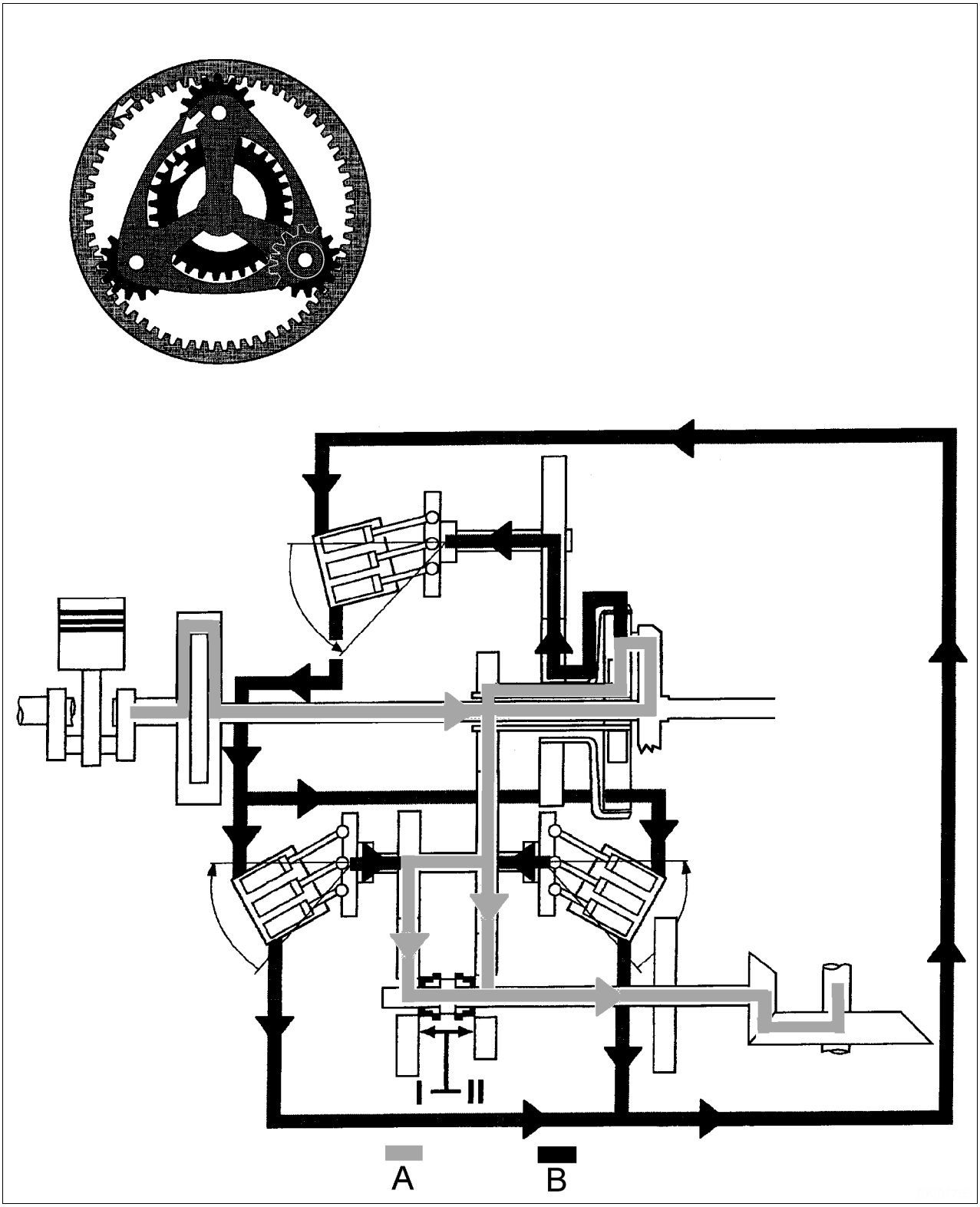

Fig. 5. I001384

A Mechanical power flow	**B** Hydrostatic power flow

Transport 40 km/h, 50 km/h or 60 km/h
approx. 100% mechanical power transmission

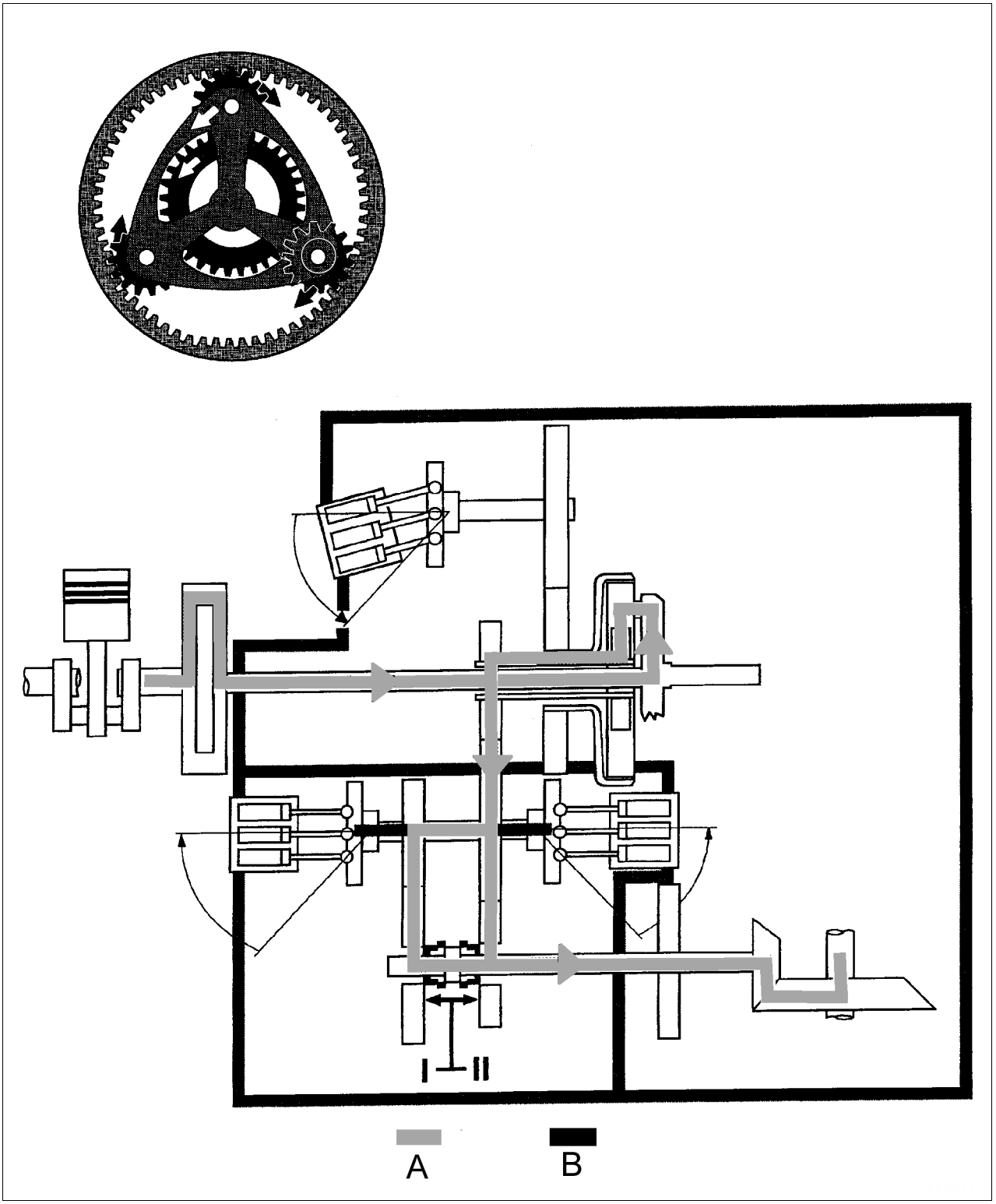

Fig. 6. I001385

A Mechanical power flow	**B** Hydrostatic power flow

Reversing

Average speed

100% hydrostatic power transmission

Ring gear rotates faster than the combustion engine

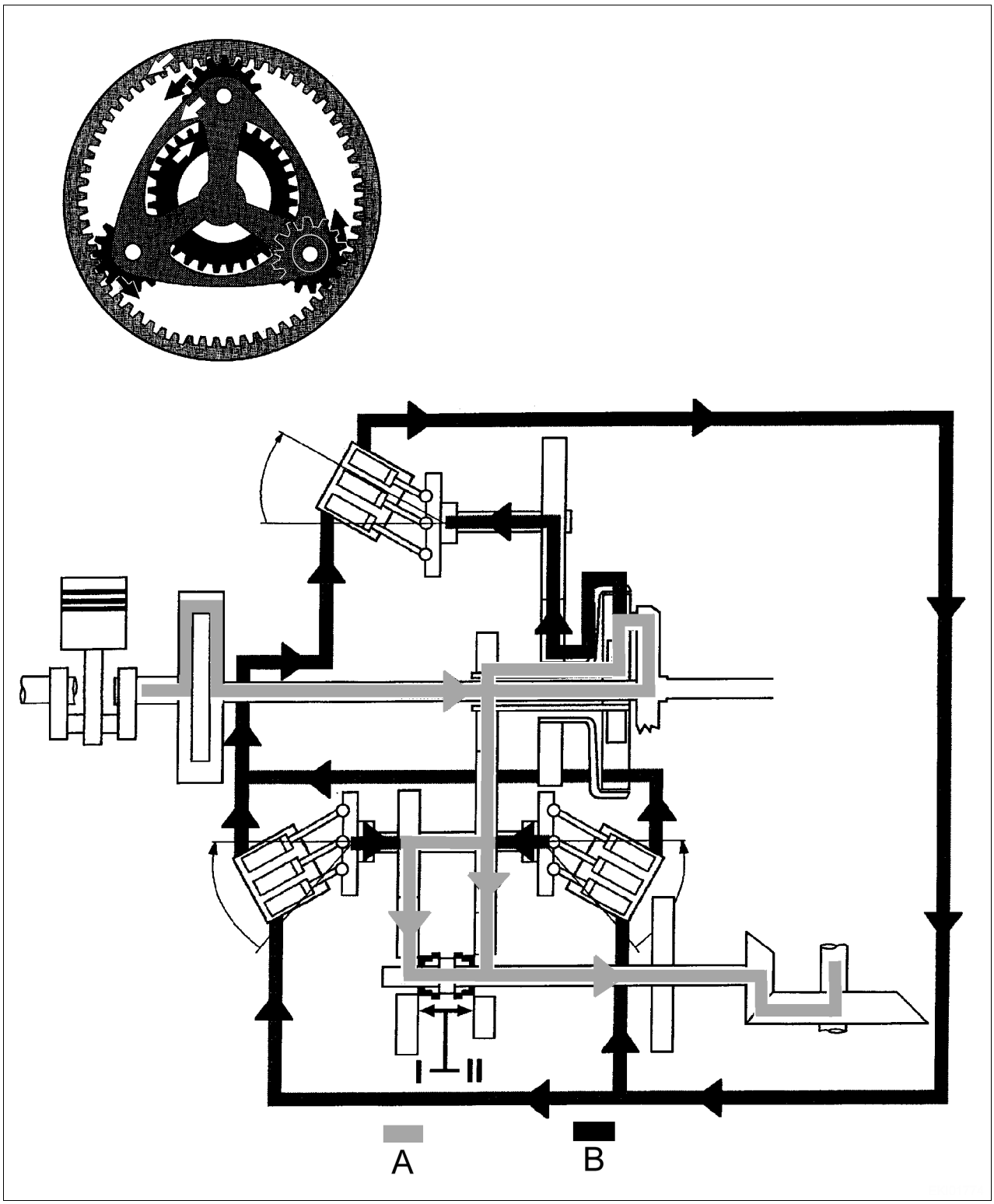

Fig. 7. I001386

A Mechanical power flow	**B** Hydrostatic power flow

C Documents and diagrams

1 Transmission hydraulic system diagram - 931.100.000.002 19

1 Transmission hydraulic system diagram - 931.100.000.002

Item	DIN	Designation	Item	DIN	Designation
Switching circuits:			**Valves:**		
1		Valve block, feed/lubrication	1V1		Radiator bypass valve
2		Main circuit	1V2		Pressure-limiting valve, discharge
3		Displacement	1V3		Pressure-limiting valve, feed
4		Valve block, enhanced hydraulics	1V4		Pressure-limiting valve, lubrication
5		Brake and rear axle	1V5		Pressure-limiting valve, servo pump
6		Valve block, rear axle	1V6		Pressure-limiting valve, servo circuit
7		Front PTO	2V1		Feed valve, forward
Pumps:			2V2		Feed valve, reverse
1P1		Servo pump	2V3		High-pressure limiting valve, forward
1P2		Lubrication pump	2V4		High-pressure limiting valve, reverse
2P1		Hydraulic pump	2V5		Purge valve
Drives:			2V6		Shuttle valve
2A1		Hydraulic motor	3V1		Hydraulic pump governor
2A2		Hydraulic motor	3V2		Hydraulic motor governor
3A1		Variable displacement cylinder, hydraulic pump	4V1	Y002	Solenoid valve, travel range 1
3A2		Variable displacement cylinder, hydraulic motor	4V2	Y003	Solenoid valve, travel range 2
3A3		Speed governor, emergency mode	4V3	Y005	Solenoid valve, speed governor
4A1		Range selector	4V4	Y004	Turbo clutch solenoid valve
6A1		Clutch, rear PTO	4V5		Pressure-limiting valve, clutch
6A3		Selector cylinder, PTO level 1 (1)	4V6		Pressure reducing valve, rear axle
6A4		4WD clutch	6V1	Y008	Solenoid valve, rear PTO
6A5		Differential lock, rear axle	6V3	Y026	Solenoid valve, PTO level 1 (1
6A6		Selector cylinder, PTO level 2	6V4	Y009	4WD solenoid valve
6A7		Differential lock, front axle	6V5	Y010	Solenoid valve, differential lock
Buzzers:			6V6	Y027	Solenoid valve, PTO level 2
1S1	B009	Discharge temperature	**Measuring points:**		
1S2	S017	Transmission oil contamination switch	M1		Radiator feed
4S1	B008	Sensor, high-pressure 1	M2		Pressure lubrication
4S2	B039	Sensor, high-pressure 2	M3		Outlet pressure
Other components:			M4		Inlet pressure
1Z1		Suction filter with bypass	M5		Pressure, servo pump
1Z2		Pressure filter with bypass	M6		System pressure, transmission
1Z3		Transmission oil cooler	M7		Switching pressure, travel range 1
1Z4		Transmission lubrication	M8		Switching pressure, travel range 2
3Z1		Actuator shaft	M9		High-pressure
3Z2	A009	Actuator unit	M10		System pressure, rear axle
4Z1		Clutch pedal with sensor cylinder	M11		Pressure, PTO clutch
4Z2		Pressure accumulator	M13		Switching pressure, PTO level 1 (1)
4Z3		Strainer insert	M14		Pressure, 4WD clutch
4Z4		Rotary feedthrough RÜFA	M15		Pressure, differential lock

5Z2		Lubrication, rear PTO	M16		Switching pressure, PTO level 2
			M18		Lubrication pressure, rear axle
			M22		Clutch and turbo-clutch valve leakage

1. Depending on the version, level 1 operates at the following PTO speeds: 540/540 E or 1000 E (1000 E is available from chassis number 9XX/2X/3501 onwards on request).

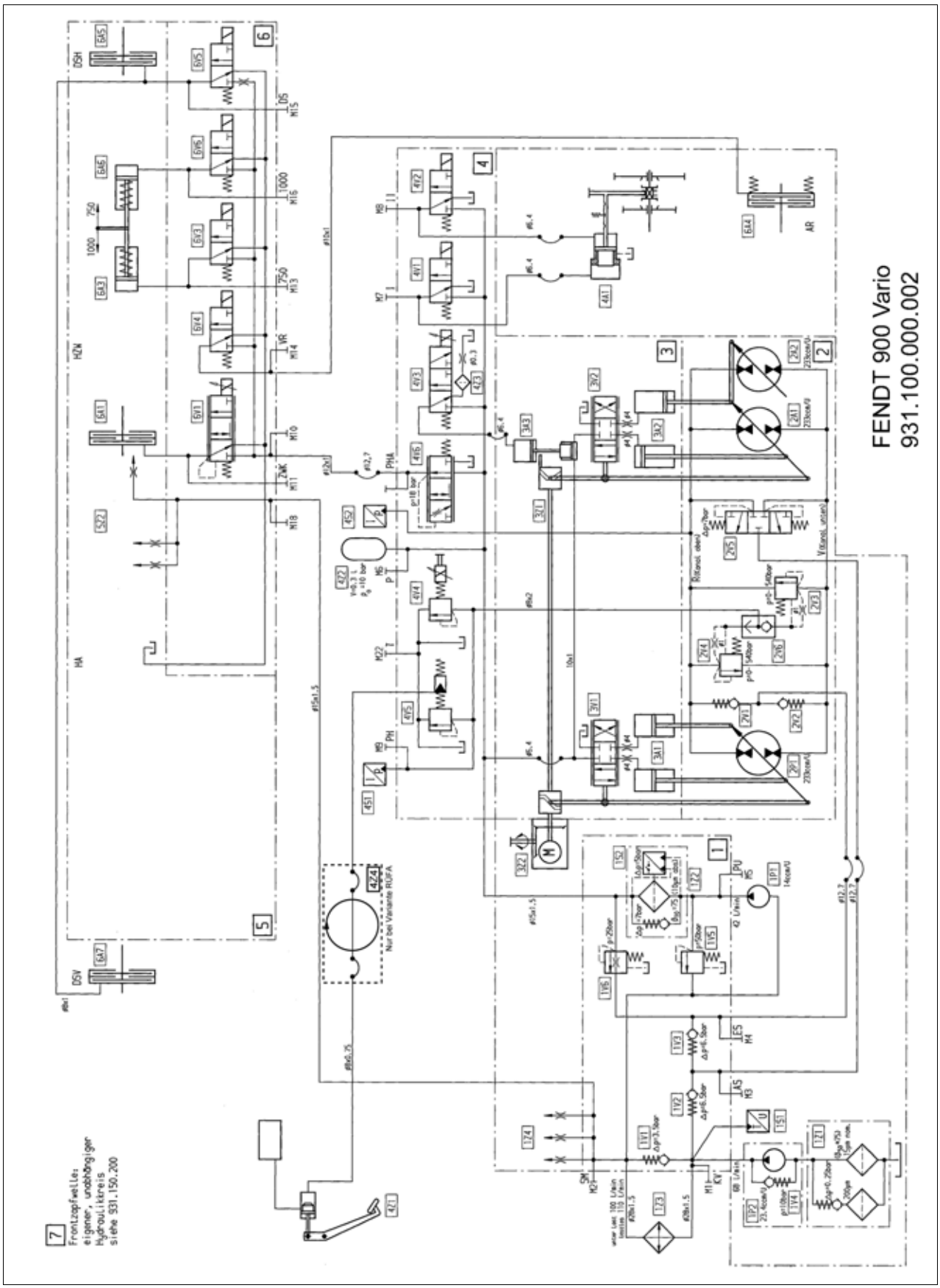

Fig. 1. I001543

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E Measuring and testing

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4 Enhanced control pressure measurement: transmission (fax template) 31
5 Inspecting the clutch or turbo-clutch pressure-limiting valve 32
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1 Pressure measuring points on transmission and control hydraulics

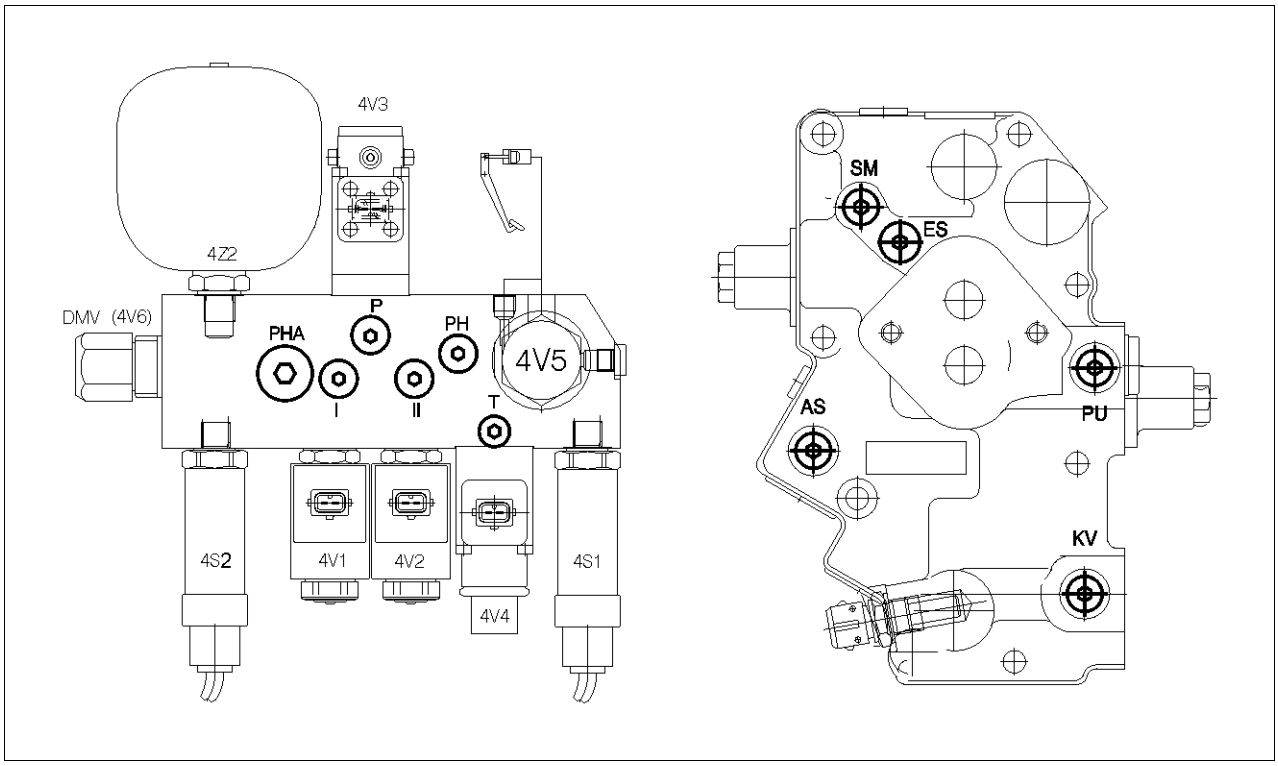

Fig. 1. I001390

Mounted at rear on the rear axle housing

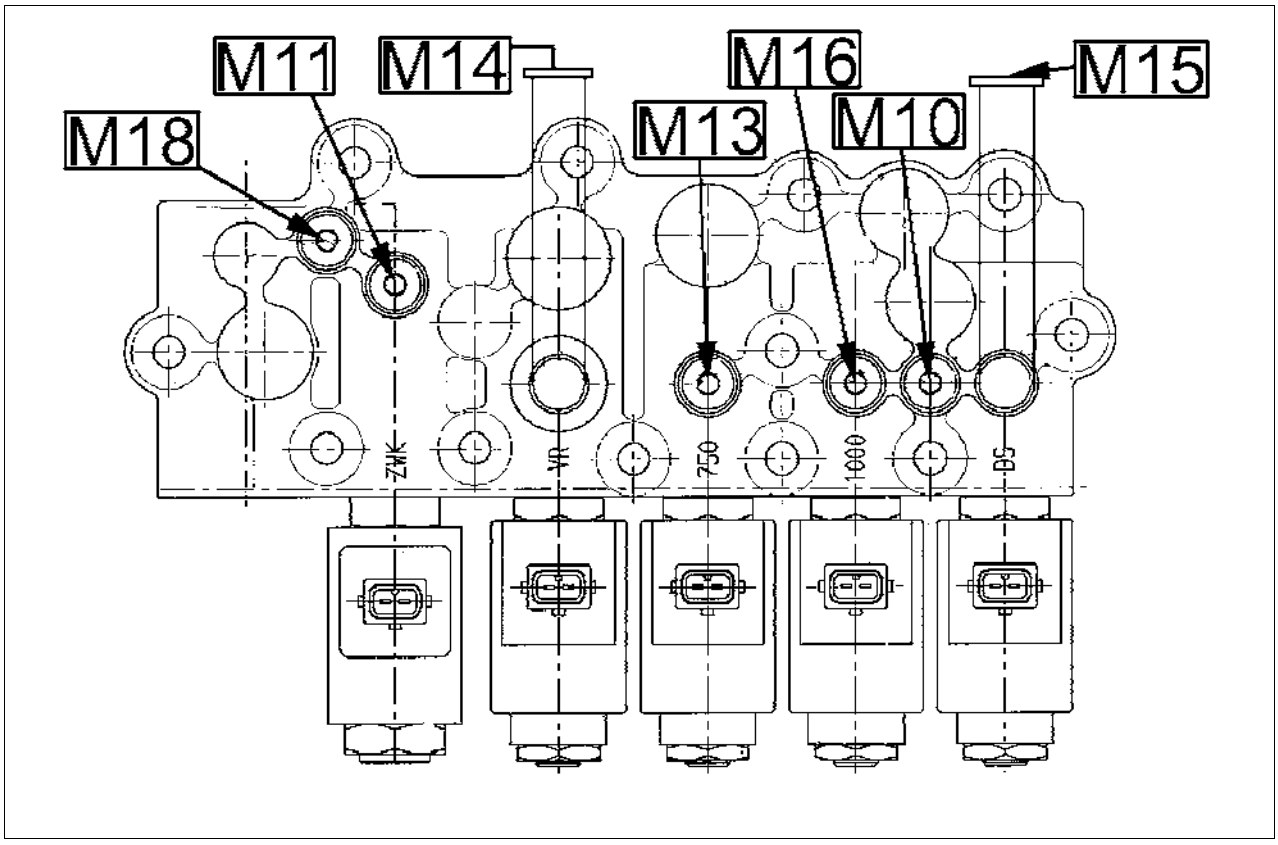

Fig. 2. I001391

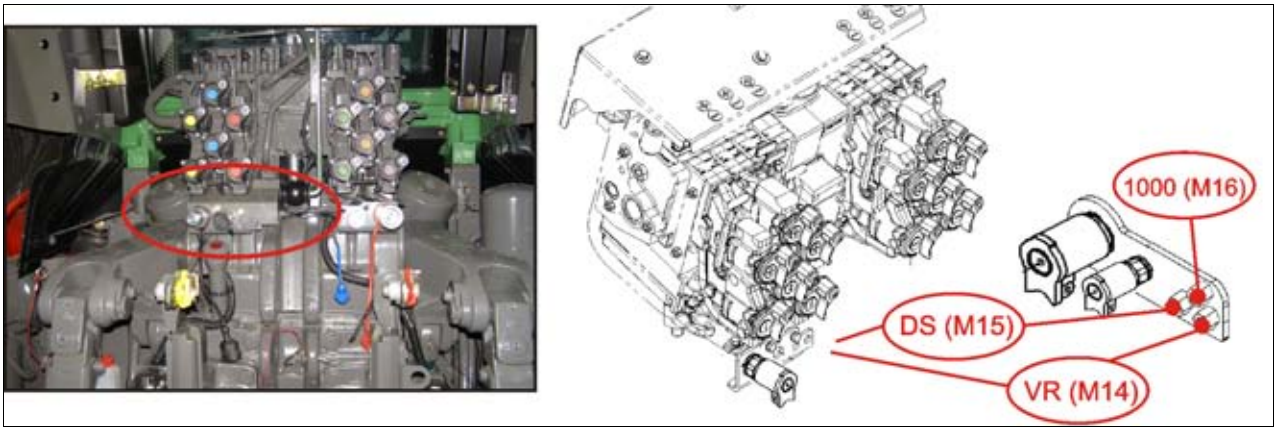

Fig. 3. I011587

M14	Pressure, 4WD clutch	M16	Switching pressure, PTO 1000
M15	Pressure, differential lock		

The measuring connections at the rear right and left of the cover plate on the rear axle housing may also be used for checking the rear PTO.

NOTE: *Measuring connection M16 is present from chassis number 9XX / 2X / 3501.*

1 PTO clutch
(Measuring connection M12 x 1.5)
2 Lubrication pressure, rear axle
(Measuring connection M10 x 1)
3 PTO control 540/750
(Measuring connection M10 x 1)

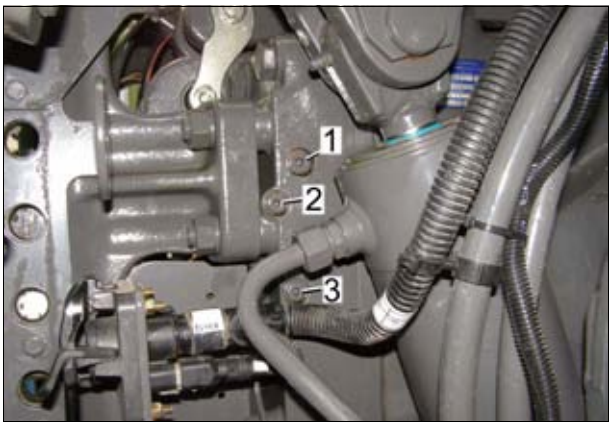

Fig. 4. I001405

4 PTO control 1000
(Measuring connection M10 x 1)

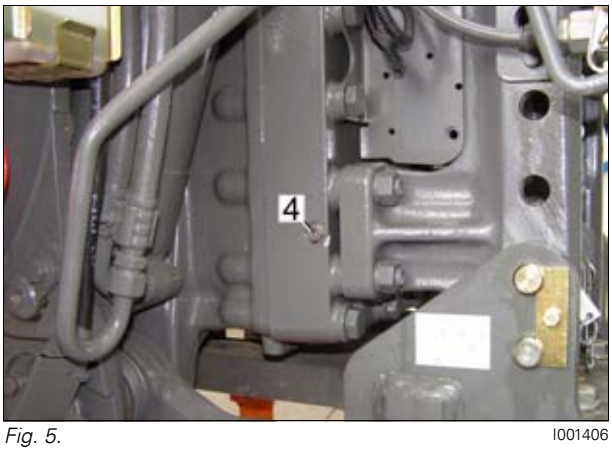

Fig. 5. I001406

Measuring point	Mark on the component	Designation	Measuring point	Mark on the component	Designation
M1	KV	Radiator feed	M10	PHA	System pressure, rear axle
M2	SM	Pressure lubrication	M11	PTO clutch	Pressure, PTO clutch
M3	AS	Outlet pressure	M13	750	Switching pressure, PTO 540E
M4	ES	Inlet pressure	M14	VR	Pressure, 4WD clutch

Measuring point	Mark on the component	Designation	Measuring point	Mark on the component	Designation
M5	PU	Pressure, servo pump	M15	DS	Pressure, differential lock
M6	P	System pressure, transmission	M16	1000	Switching pressure, PTO 1000
M7	I	Switching pressure, travel range I	M18		Lubrication pressure, rear axle
M8	II	Switching pressure, travel range II	M22		Clutch and turbo-clutch valve leakage
M9	PH	High-pressure			

M1 System pressure
M2 Clutch pressure

Fig. 6. Front PTO I003549

2 Measuring transmission pressure

In the event of complaints regarding Vario tractors that indicate malfunctions in the transmission or are generally captured under the heading "Power", proceed as follows.
It must be determined whether the complaint is attributable to inadequate engine power or inadequate power from the drive train (transmission).

1. Low engine power
In the event of inadequate engine power, the power must be measured at the PTO via a reduction in engine speed from the rated speed to 1600 rpm, in increments of 50 rpm.
Engine brakes that allow computer-assisted evaluation are recommended. These enable power and torque curves to be calculated precisely.

2. Low drive train power (transmission)
For all complaints indicating that the possible cause is transmission-related, a hydraulic measurement must be carried out in the transmission before any repairs are attempted. The "Transmission pressure measurement (fax template)" test report must also be filled out. The procedures in this document are repeated as a check following the repair.

High-pressure check is also possible via terminal A040 or A054.

DANGER: For all transmission pressure measurements, all 4 tractor wheels must be jacked up to prevent the risk of accident!

IMPORTANT:
– *Engage 4WD*
– *Oil temperature in the transmission 35-45°C*

3 Transmission pressure measurement (fax template)

Workshop (Address):	
Workshop (Customer number):	
Chassis number:	
Operating hours:	
Complaint (if available: specify the fault code)	
Date, Signature	

DANGER: For all transmission pressure measurements, all 4 tractor wheels must be jacked up to prevent the risk of accident!

I. Testing supply pressures

NOTE: *Transmission oil temperature is 35-45°C for all pressure measurements*

Measuring point	Engine speed	Setpoint value in bar	Actual value in bar
PU M5 Pressure, servo pump	800 1200 1600 2000	25±2 26±2 27±2 28±2	
P M6 System pressure, transmission	800 1200 1600 2000	25±2 25.5±2 26±2 27±2	
ES M4 Inlet pressure	800 1200 1600 2000	16±2 19±2 21±2 24.5±3	
AS M3 Outlet pressure	800 1200 1600 2000	9±2 11±2 13±2 16±2.5	
SM M2 Pressure lubrication	800 1200 1600 2000	2±0.4 3±0.5 4.2±0.6 5.5±0.8	

II. High-pressure measurement

Measure the pressure driving forwards and in reverse.

DANGER: Perform each high-pressure measurement forwards or backwards for max. 5 seconds, to prevent oil heat-up!

Preparations: travel range II, acceleration stage 4 or transmission in emergency mode (emergency operation from cab using auxiliary lever)

Measuring point	Engine speed	Setpoint value in bar	Actual value in bar
PH	1600	540±20	*

NOTE: *Load PH high-pressure circuit for max. 5 seconds, performing the following measurements at the same time.*

Measuring point	Engine speed	Setpoint value in bar	Actual value in bar
P	1600	26±2	
ES	1600	22±2	
AS	1600	15±2	
SM	1600	3.5±0.4	

NOTE: **If high pressure PH is not reached, but pressures AS and ES are OK: Test clutch valve 4V4 and turbo-clutch valve 4V5 – see Chapter 1005 Reg. E.*

4 Enhanced control pressure measurement: transmission (fax template)

Workshop (Address):	
Workshop (Customer number):	
Chassis number:	
Operating hours:	
Complaint (if available: specify the fault code)	
Date, Signature	

Check switch function pressures

Measuring point	Engine speed rpm	Setpoint value in bar	Actual value in bar
I and II Travel range control 1+2	1600	26±2	

Energise solenoid valves 1 (4V1) and 2 (4V2) alternately with 12 VDC.

Rear PTO, differential lock and 4WD coupling

NOTE: *Allow engine to run at 1200 rpm. Check pressure at respective connection and M18 simultaneously.*

Consumer switch position	Measuring point	Setpoint value in bar	Actual value in bar	Pressure lubrication M18 Setpoint value in bar	Pressure lubrication M18 Actual value in bar
Rear PTO - ON	**M11**	18+2.0		2.0±0.3	
Differential lock - ON	**M15**	18+2.0		2.0±0.3	
4WD ON/OFF	**M14**	18+2.0		2.1±0.3	
Rear PTO 540E - ON	**M13**	18+2.0		2.0±0.3	
Rear PTO 1000 - ON	**M16**	18+2.0		2.0±0.3	
Depress brake	**M10**	18+2.0		1.2±0.3	

The measuring connections at rear right and left on the cover plate may also be used for checking the rear PTO.

Front PTO

Measuring point	Setpoint value in bar	Actual value in bar
M1	16±2	
M2	16±2	

5 Inspecting the clutch or turbo-clutch pressure-limiting valve

Turbo-clutch pressure-limiting valve 4V4/Y004

If the max. pressure is not reached during a high pressure measurement, the cause may originate from the drive train or may lie outside in the valve block. To decide if it is necessary to dismantle the drive train, one should first check the valve block (transmission control system) for leaks.

The turbo-clutch valve (4V4) controls the PH high-pressure in proportion to the engine speed up to 1250 rpm. This achieves the turbo-clutch function.
The turbo-clutch valve is fitted to the valve block, which also comprises the connection from the PH high-pressure circuit to the tank. If this connection is not closed, i.e. the turbo-clutch valve is not completely closed, high pressure build-up is not possible and the tractor does not achieve the maximum traction performance.
The turbo-clutch valve (4V4) closes the PH high-pressure circuit to the tank.

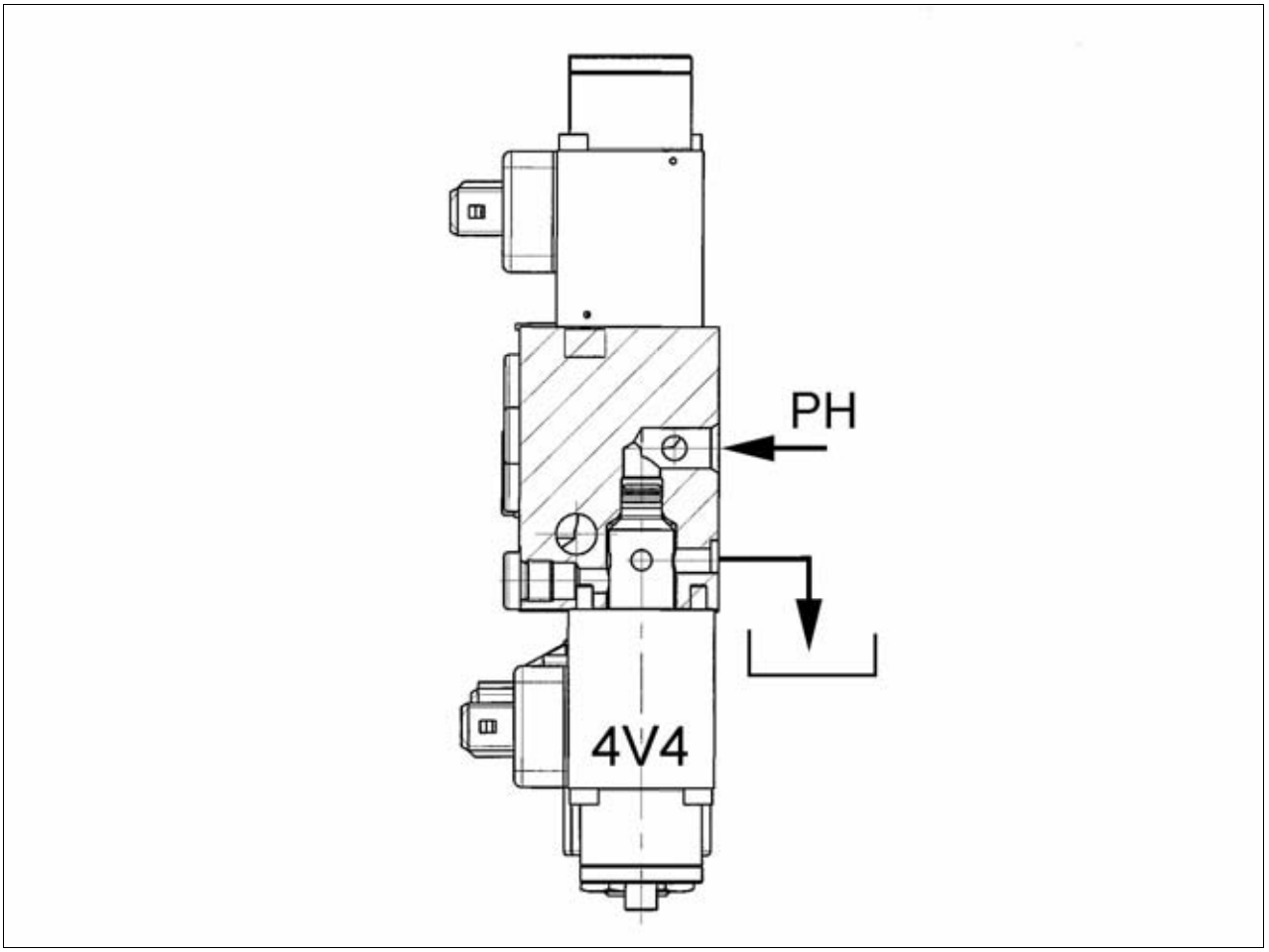

Fig. 7. I002091

The turbo-clutch valve is controlled from the electronics box. The electrical current drawer depends on the engine speed and is as follows:

Engine speed	Current draw	max. PH	Note
800 rpm	0 A	0 bar	Transmission neutral
800 rpm	0.34 A	78 bar	Transmission active
1200 rpm	1.02 A	105 bar	
from 1250 rpm	1.40 A	540 bar	

In order to carry out a leakage check it is possible to lock the turbo-clutch valve mechanically.

Screw in the hex. socket head screw

Fig. 8. I002100

Clutch pressure-limiting valve 4V5

The clutch pressure-limiting valve is fitted to the valve block, which also comprises the connection from the PH high pressure to the tank.

The clutch valve also limits the PH high pressure to 550 bar (±15 bar).

The clutch valve closes the high-pressure circuit to the tank if the clutch pedal is not depressed.

When the clutch pedal is actuated, the clutch valve opens and the PH high pressure builds up via the connection to the tank.

There is then a reduction in high pressure (traction interruption) proportional to the travel of the clutch pedal (similar to mechanical drive clutch)

Clutch pedal completely pressed: PH high pressure = 0 bar

The max. high pressure and the high pressure build-up depends on the functionality as well as the sealing of the clutch pressure-limiting valve (4V5)

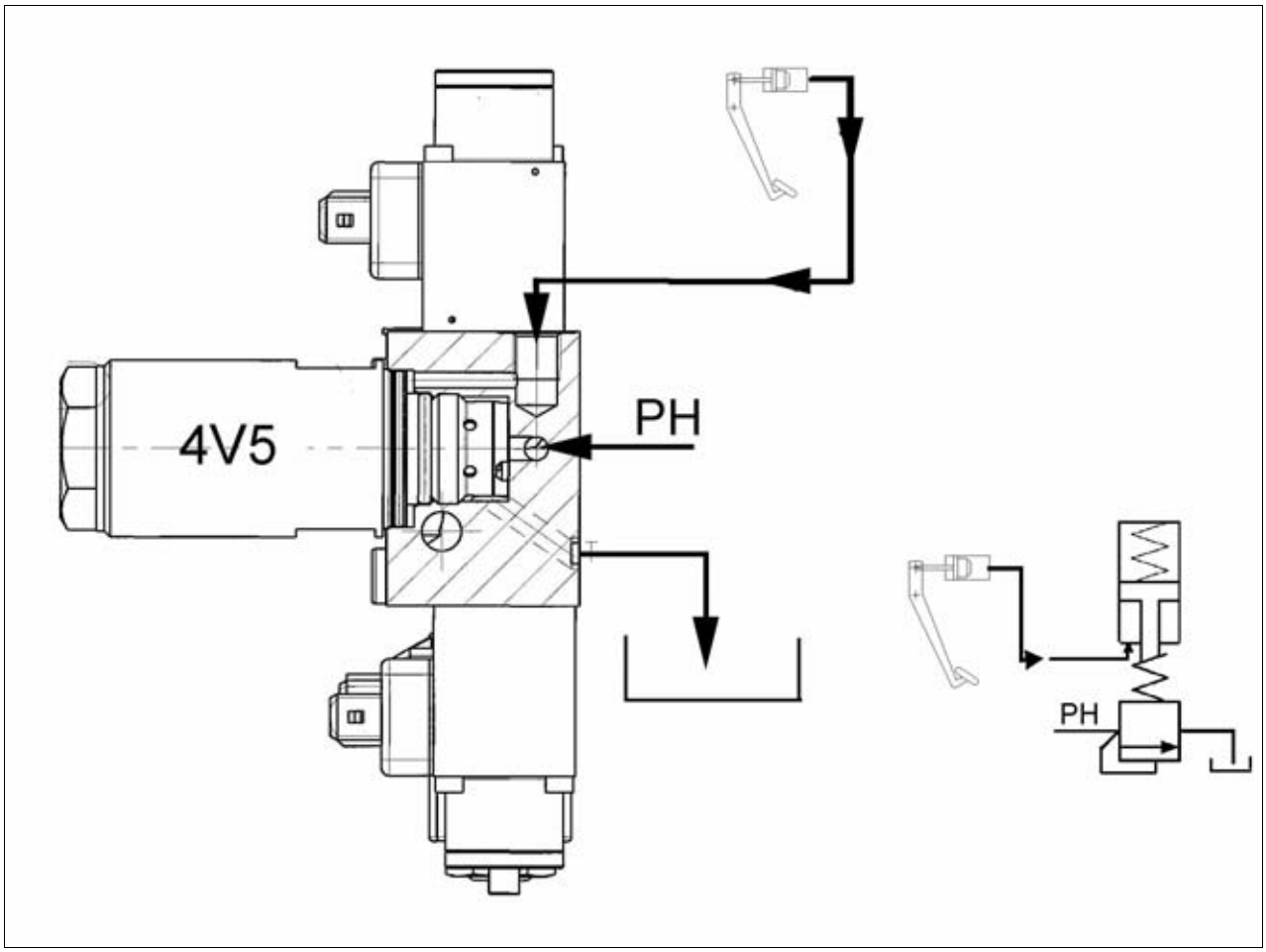

Fig. 9. I002101

Checking the high-pressure circuit in the valve block
The following tasks must be carried out:

DANGER: Support the tractor safely on four support trestles (high pressure measurement)

– Remove the right rear wheel as well as the cover panels
– Remove the screw plugs on the T connection
– Connect a pressure gauge with a rating higher than 550 bar to the PH measurement connection

Conducting the test

1. Start engine.
2. Apply the handbrake firmly and depress the footbrake
3. Engine speed greater than 1400 rpm (PVM activated signal)
4. Attach the auxiliary lever and drive the transmission against high pressure.

NOTE: *Before checking the clutch valve (4V4) the clutch pedal must be calibrated.*

see §11

Measurement (example)

PH	T connection	Possible cause of fault
250 bar	No oil is flowing from T	Drive train fault (check the high-pressure valves and purge valve and the screw connections in the pressure line); dismantle the drive train
250 bar	Oil is flowing from T	Turbo-clutch valve (4V4) or clutch valve (4V5) leaking

Checking the turbo-clutch valve (4V4)
Mechanically block the turbo-clutch valve (screw in the hex. socket head screw)

PH	T connection	Possible causes of the fault
250 bar	Oil is flowing from T	Clutch valve (4V5) leaking (replace)
550 bar	Oil is flowing from T	Electrical check of TK valve Y004

6 Enhanced control hydraulics valve block (rear axle)

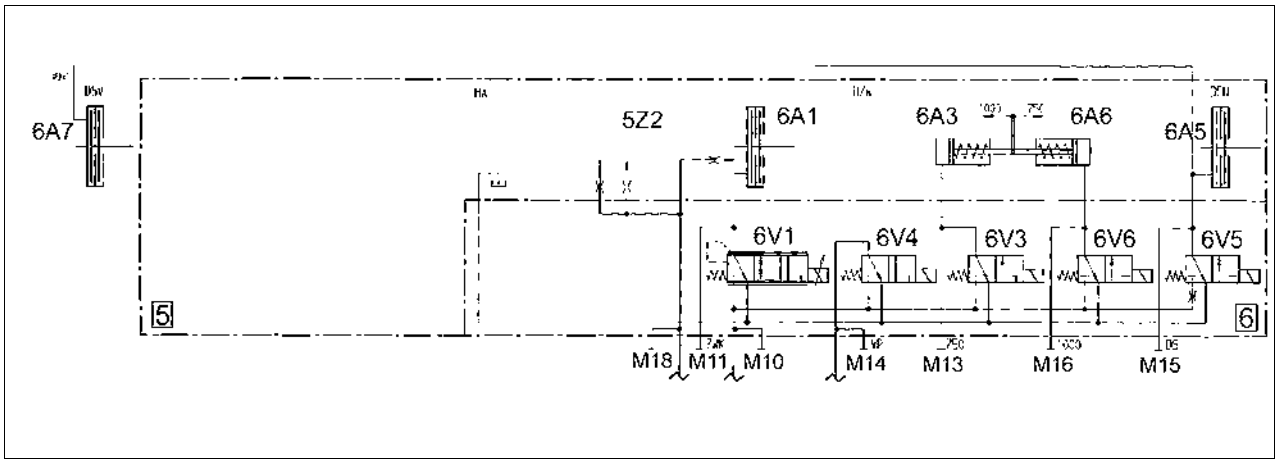

Fig. 10. I001568

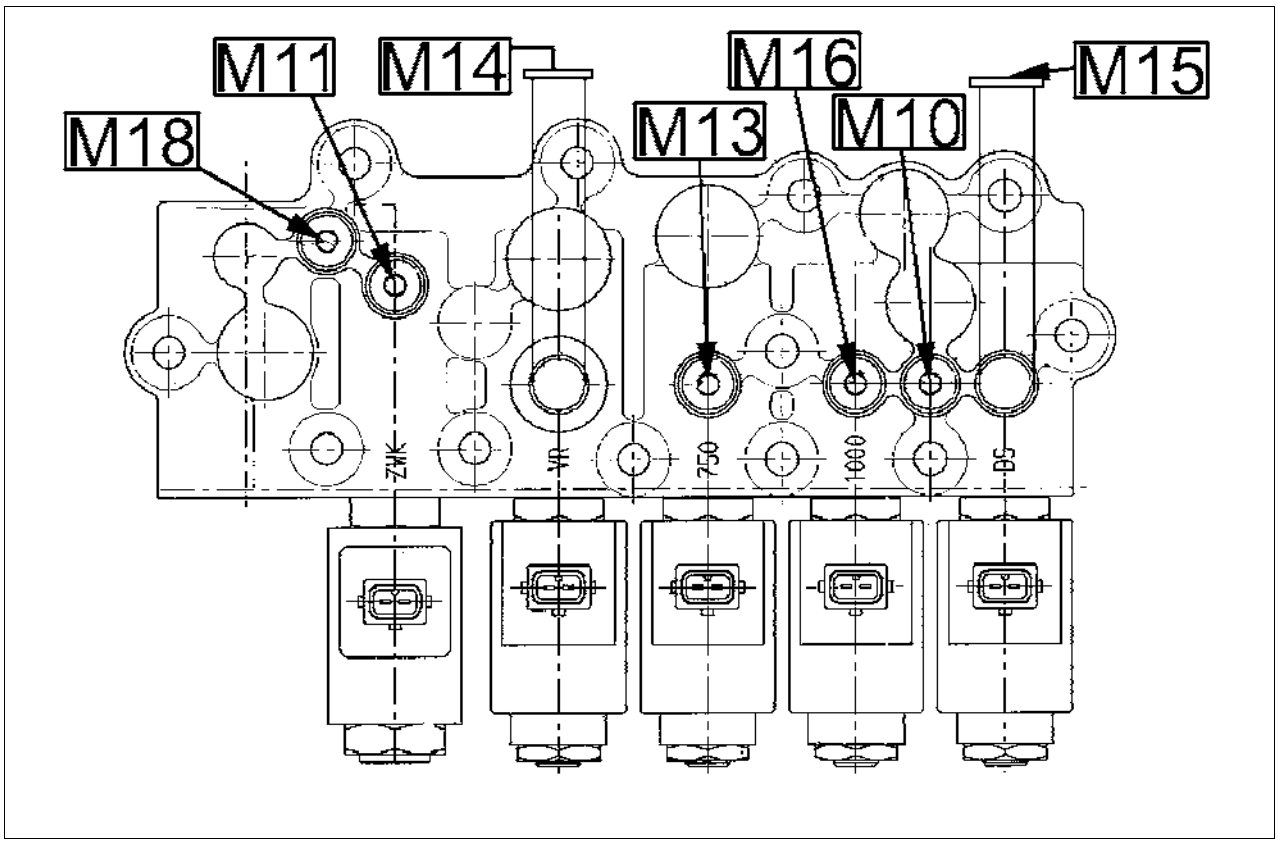

Fig. 11. I001391

7 Valve block, inlet/lubrication

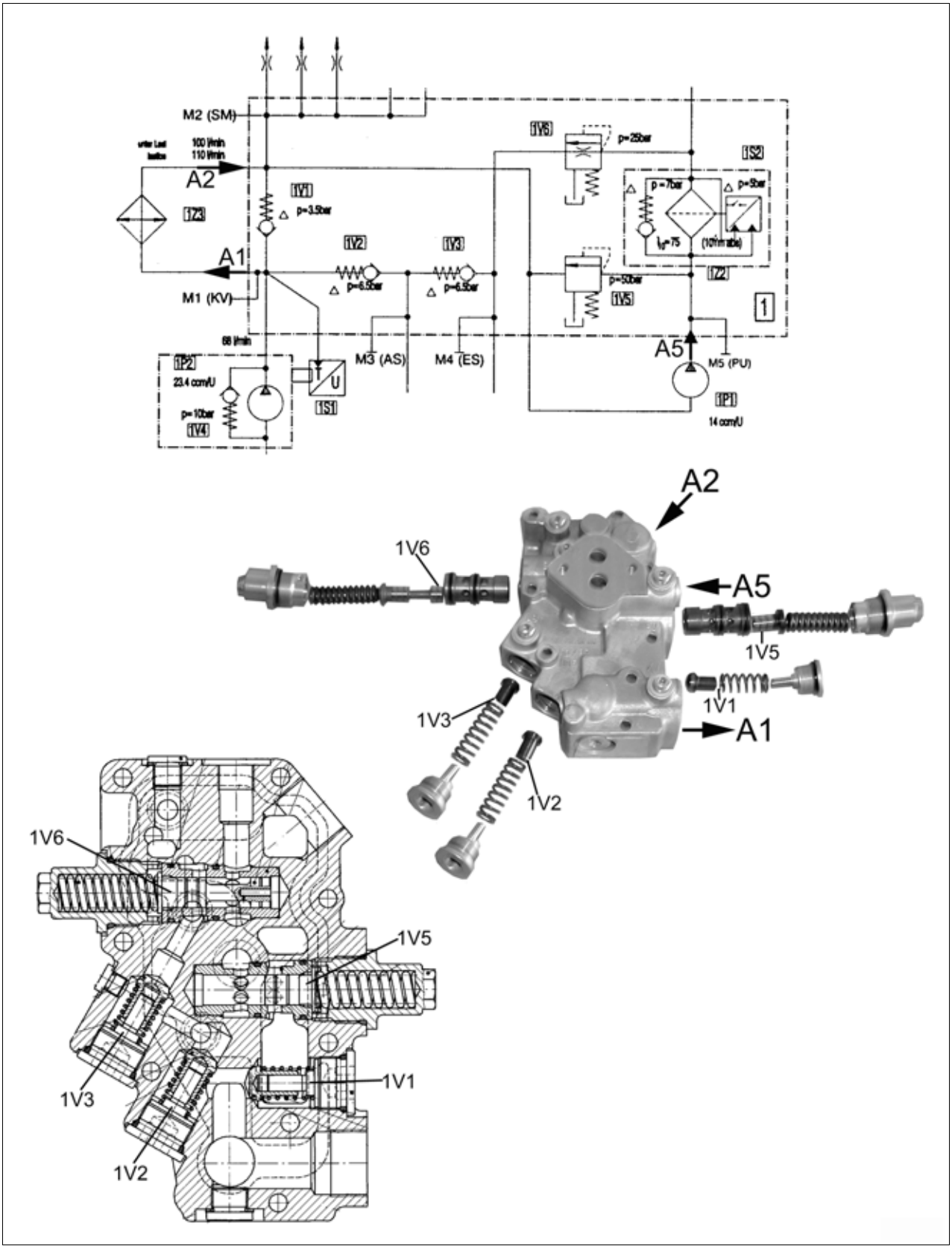

Fig. 12. I001389

1V1	Radiator bypass valve (3.5 bar)	1V5	Pressure-limiting valve, servo-pump (50 bar)
1V2	Pressure-limiting valve, outlet (6.5 bar)		
1V3	Pressure-limiting valve, inlet (6.5 bar)	1V6	Pressure-limiting valve, servo-circuit (25 bar)

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

1010

Transmission/differential

1010 Transmission/differential

G Repair 5

G Repair

1 Remove differential gear 7
2 Installing the differential 11
3 Dismantling differential gear 16
4 Assembling the differential gear 20
5 Dismantling the pinion shaft. 25
6 Adjusting and fitting the pinion shaft 28
7 Pinion shaft - ring gear backlash adjustment 34

1 Remove differential gear

Preliminary work:

– *see §1*

NOTE: *The work was carried out on a model for greater clarity.*

Carry out the following tasks on both sides.

Unscrew the hand brake release screw on the Tristop cylinder by turning counterclockwise until it becomes noticeably more difficult to turn, then tighten as far as it will go with a spanner (SW24)

Fig. 1. I002468

Unplug the air hoses and sensors

Fig. 2. I002469

Remove Tristop cylinder

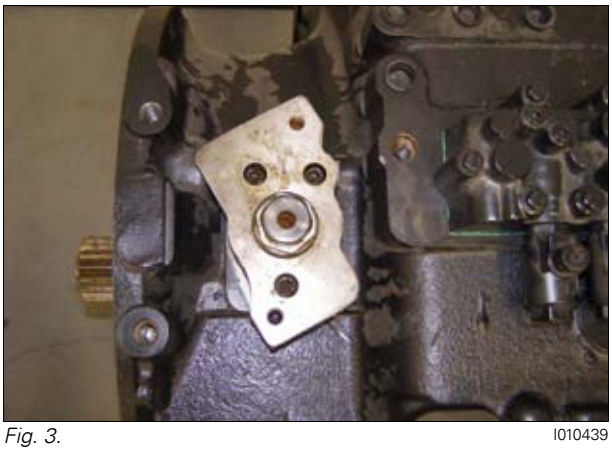

Fig. 3. I010439

Remove lower part of brake cylinder

Fig. 4. I010440

Remove brake plate hex bolts

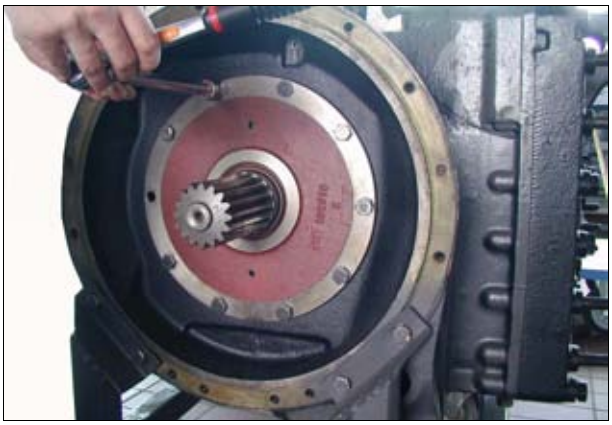

Fig. 5. I002637

Remove brake plate using a slide hammer puller

Fig. 6. I002638

Remove brake plate

Fig. 7. I002639

Remove shaft

Fig. 8. I002643

Remove front disc pack

Fig. 9. I002644

Remove actuator plate and rear disc pack

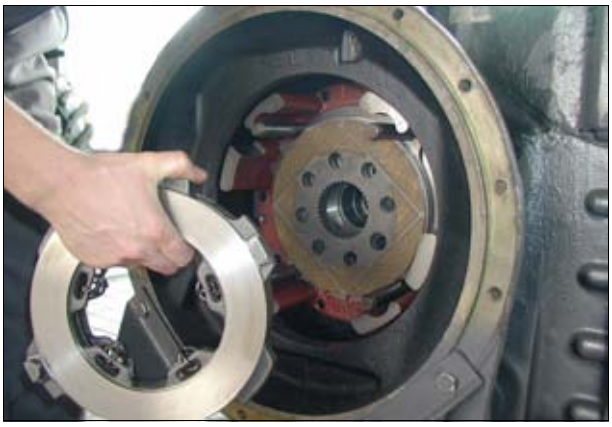

Fig. 10. I002645

Attach hoisting gear to differential gear

Fig. 11. I002649

Press off bearing flange with jack screws

Fig. 12. I002646

Remove bearing flange

Fig. 13. I002647

Remove differential gear using the hoisting gear

Fig. 14. I002648

2 Installing the differential

NOTE: *The work was carried out on a model for greater clarity.*

Fit the differential in the transmission housing using the hoisting gear

Fig. 15. I002668

The following tasks must be carried out on both sides. Starting on the right side.

Fit stud bolts (M12x180) as a mounting aid

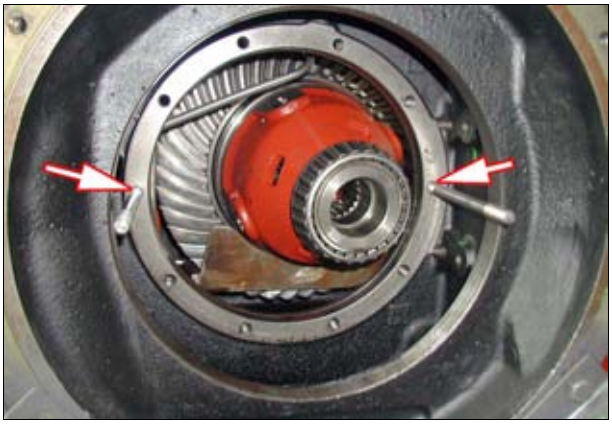

Fig. 16. I002674

Push the bearing flange on to the stud bolts. Fit the bolts for the externally toothed discs

Fig. 17. I002675

Fit the spacer

Fig. 18. I002676

Fit the thrust ring with collar facing inwards

Fig. 19. I002677

Fit the circlip

Fig. 20. I002686

Fit 3 pairs of discs. Starting with the externally toothed discs

NOTE: *Fit the externally toothed discs 90° offset to each other*

Fig. 21. I002678

Fit the actuator plate

NOTE: *Attach the 3rd and 4th externally toothed discs to the actuator plate*

Fig. 22. I002679

Fit remaining discs and thread in wheel axle

Fig. 23. I002680

Fit brake plate with new shaft seal ring

Fig. 24. I002639

Tighten the brake plate hex bolts crosswise, while constantly checking the clearance of the differential, attach brake plate to system

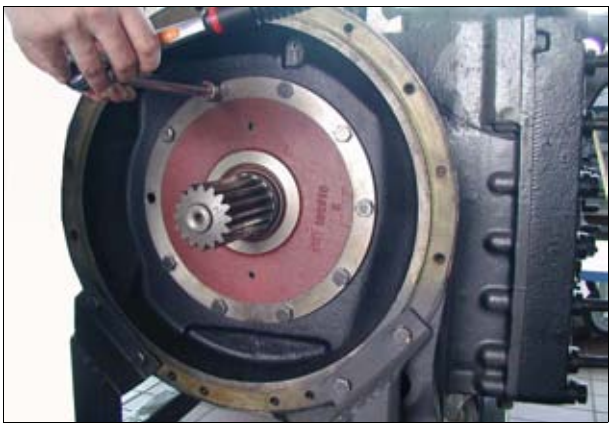

Fig. 25. I002637

Using a rotating device and torque gauge, check the roll resistance to be 4–6Nm. If necessary, use an adjusting shim

Fig. 26. I002735

Tighten hex bolts to 120 Nm

Fig. 27. I002685

Fit lower part of brake cylinder
Tightening torque for bolts: 69 Nm

NOTE: *Adjust the rear wheel brake see §1*

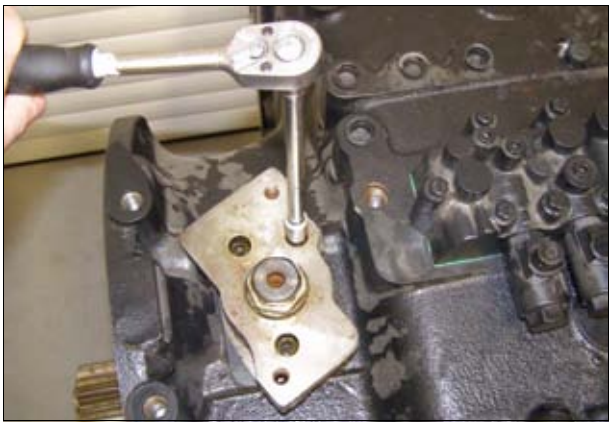

Fig. 28. I010440

Fit Tristop cylinder with flat seal
Bolt tightening torque: 86 Nm

Fig. 29. I002477

Connect air hoses and sensors

Fig. 30. I002469

Screw in the hand brake release screw on the Tristop cylinder in a clockwise direction

Fig. 31. I002468

3 Dismantling differential gear

Preliminary work:

– *see §1*

Loosen hex bolts

Fig. 32. I002650

Loosen hex socket head screws

Fig. 33. I002651

Press off the housing flange

Fig. 34. I002652

Remove the housing flange

Fig. 35. I002653

Remove the disc package with axle bevel gear

Fig. 36. I002654

Remove the ring gear

Fig. 37. I002655

Remove the shaft hollow dowel pins

Fig. 38. I002656

Remove the long shaft

Fig. 39. I002657

Remove the short shaft

Fig. 40. I002658

Remove the cross bearing

Fig. 41. I002659

Remove the pinion gears and thrust rings

Fig. 42. I002660

Remove the axle bevel gear

Fig. 43. I002661

Remove the ring disk

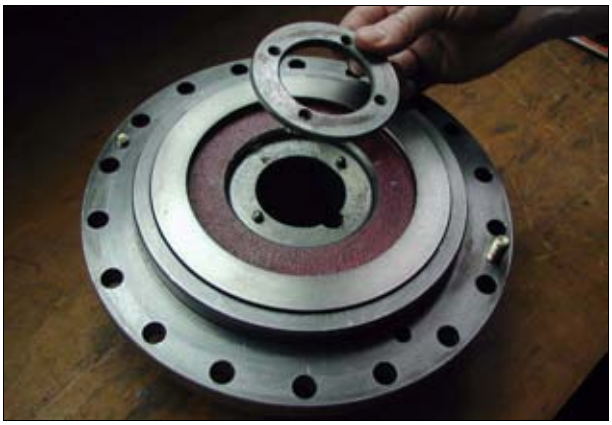

Fig. 44. I002662

Remove the piston from the housing flange

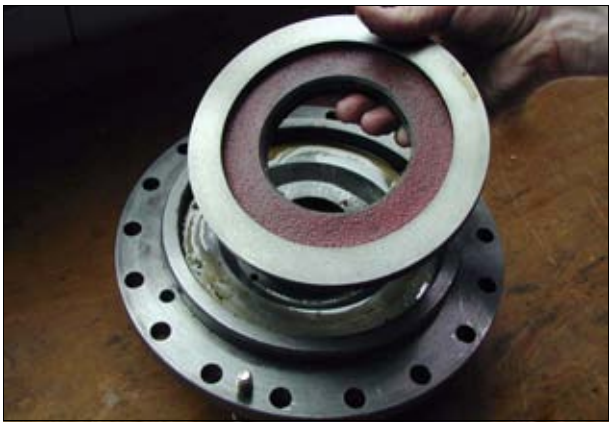

Fig. 45. I002663

Remove the taper roller bearing

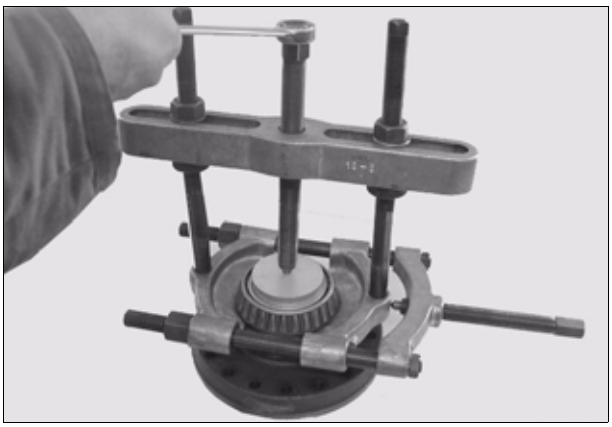

Fig. 46. I002669

4 Assembling the differential gear

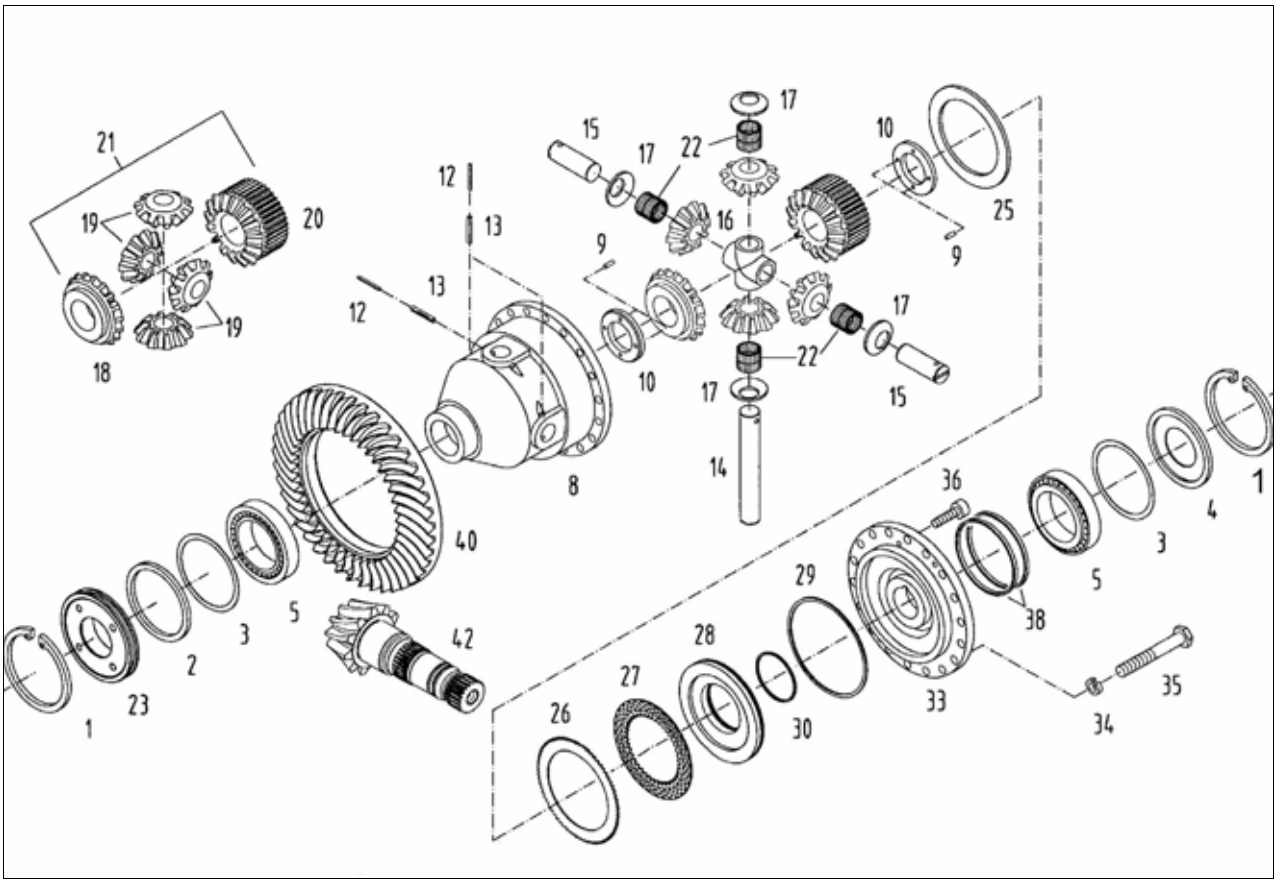

Fig. 47. I002670

1	Circlip	21	Bevel gear set
3	Shim	22	Cylinder roller bearing
4	Washer	23	Spacer
5	Taper roller bearing	25	Ring
8	Differential housing	26	External disc
9	Parallel pin	27	Internal disc
10	Ring	28	Piston
12	Dowel pin	29	Lip seal
13	Dowel pin	30	Lip seal
14	Axle	33	Housing flange
15	Axle	34	Washer
16	Cross bearing	35	Hex. bolt
17	Thrust ring	36	Socket head cap screw
18	Axle bevel gear	38	Rectangular-section ring
19	Differential bevel gears	40	Ring gear
20	Axle bevel gear	42	Pinion shaft

Heat the taper roller bearing (5) to approx. 90°C and fit it onto the housing flange (33) and differential housing (8)

CAUTION: Risk of burns!

Fig. 48. I002673

Fit the piston (28) with new lip sealing rings (29, 30) into the housing flange (33)

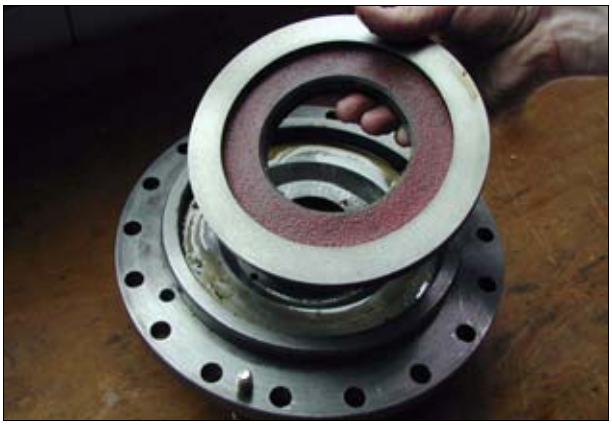

Fig. 49. I002663

Fit the ring (10) with the coated side upwards into the housing flange (33); coat the underside of the ring with heavy grease to prevent it falling out

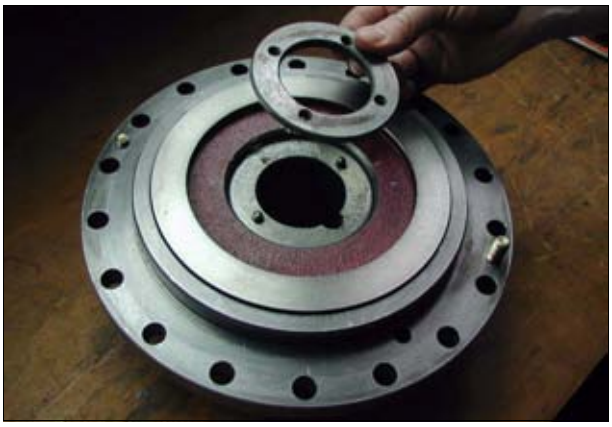

Fig. 50. I002662

Fit the ring (10) with the coated side upwards into the differential housing (8)

Fig. 51. I002671

Lay the axle bevel gear (18) in the differential housing (8)

Fig. 52. I002661

Fit the cylinder roller ring (22) into the differential bevel gears

NOTE: *Emplace the cylinder rollers with heavy grease*

Fig. 53. I002672

Fit the differential bevel gears (19) with the thrust ring (17)

Fig. 54. I002660

Fit the cross bearing (16)

Fig. 55. I002659

Fit the long axle (14) and then the two short axles (15) and secure the axles (14, 15) with the dowel pins (12, 13)

Fig. 56. I002664

Fit the axle bevel gear (20)

Fig. 57. I002665

Fit the ring (25) along with the outer and inner discs (26, 27)

Fig. 58. I002666

Fit the housing flange (33) to the differential housing (8)

Fig. 59. I002653

Fit the hex. bolts (35) and the two hex. socket head bolts (36)
Torque value for the hex. bolt (35): 120 Nm

Fig. 60. I002667

Fit the rectangular-section rings (38)

Fig. 61. I002734

5 Dismantling the pinion shaft

Preliminary work:

– *see §1*

– Separate the rear axle from the transmission housing

NOTE: *The work was carried out on a model for greater clarity.*

Remove the pinion shaft lubricating line

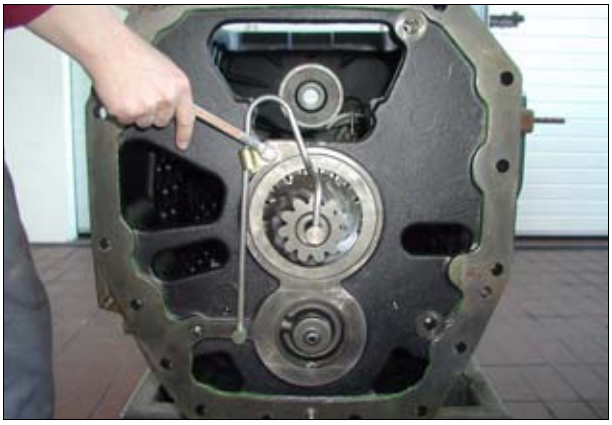

Fig. 62. I002688

Remove the inner securing ring as well as the spacers

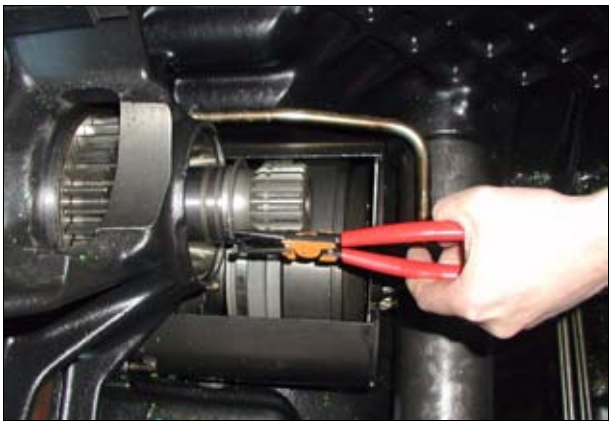

Fig. 63. I002700

Place a hydraulic jack between the bevel pinion shaft and the supporting frame (self-made) and push out the pinion shaft

Fig. 64. I002690

Remove the pinion shaft

Fig. 65. I002691

Remove the bevel roller bearings from the pinion shaft

Fig. 66. I002712

Remove the securing ring and toothed gear

Fig. 67. I002692

Remove the bevel roller bearing

Fig. 68. I002693

Remove the adjustment spacer

Fig. 69. I002689

6 Adjusting and fitting the pinion shaft

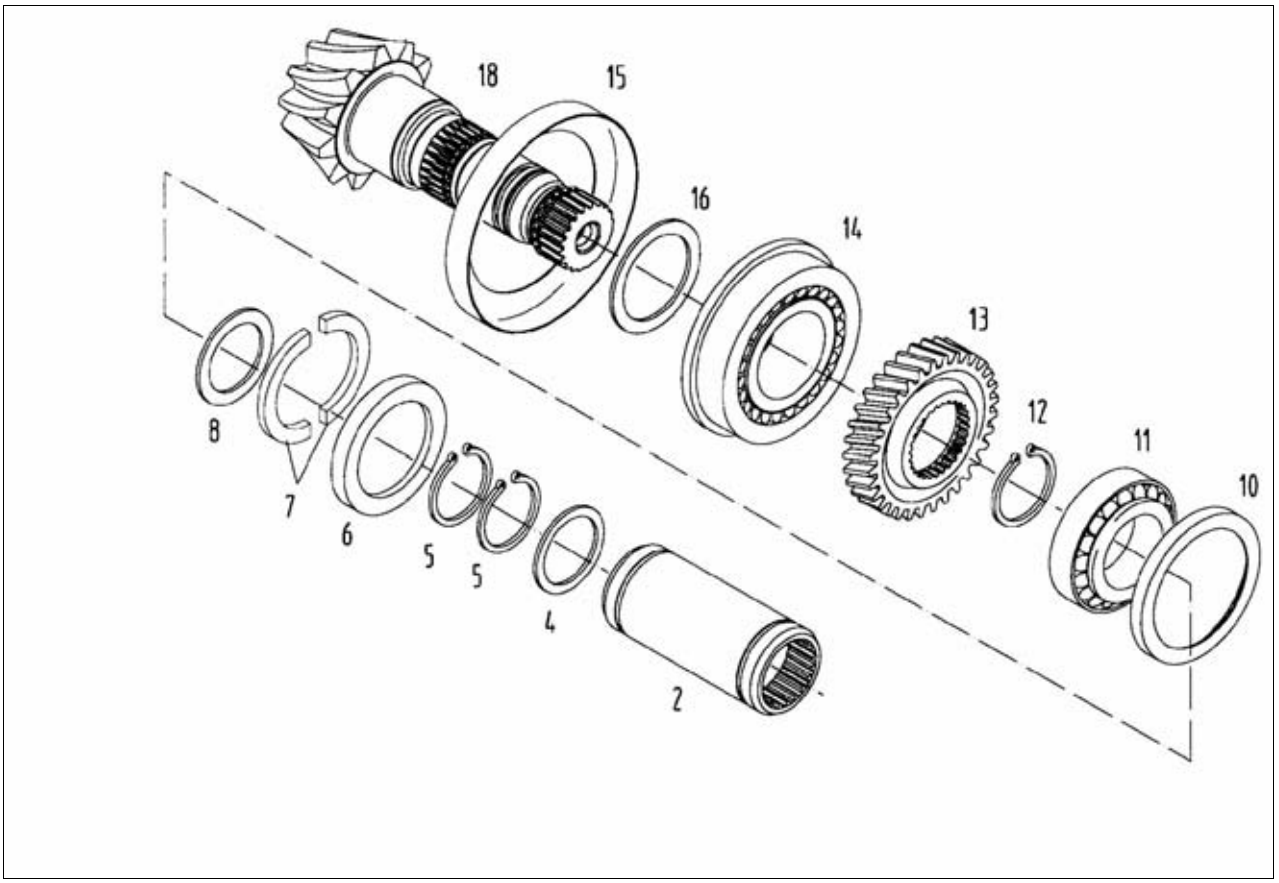

Fig. 70. I002713

2	Spigot bush	12	Circlip
4	Locating ring	13	Spur gear
5	Circlip	14	Taper roller bearing
6	Ring	15	Oil tray
7	Ring	16	Shim pack
8	Shim pack	18	Pinion shaft
10	Oil tray	19	Ring gear
11	Taper roller bearing		

NOTE: *The work was carried out on a model for greater clarity.*

Adjusting the pinion shaft

Determining the spacer thickness S (16):

Calculated spacer thickness $\mathbf{S}_{\text{target}} = \mathbf{G + A - E - F}$

Chosen spacer thickness $\mathbf{S}_{\text{actual}} = \mathbf{S}_{\text{target}}$ **-0.04 mm**

- G = Actual dimension middle of rear axle - flange surface (nominal dimension = 190)
- A = Bore depth in transmission housing (nominal dimension = $20^{+0.1}$).
- E = Bearing width (nominal dimension = $20^{+0.2}$).
- F = Actual installation dimension of pinion shaft (nominal dimension = 187)

Determining dimension A:

Determine bore depth from outer flange face.

Nominal dimension = $20^{+0.1}$

Fig. 71. I002694

Determining dimension E:

Carefully roll in the tapered roller bearing before taking the measurement

Carry out the measurement on a level surface (surface plate)

Nominal dimension = $20^{+0.2}$

Fig. 72. I002695

Determining dimension F:

The installation dimension is engraved on the front end of the pinion shaft

Nominal dimension = 187

Fig. 73. I002696

The actual dimension is engraved on the flange surface of the rear axle housing

Nominal dimension = 190

Fig. 74. I002707

Spacer thickness (16) S = G + A - E - F	
Dimension G =	190.02
Dimension A =	20.03
Dimension E =	20.2
Dimension F =	187.00
S =	2.85

Fig. 75. I002689

Fitting the pinion shaft

Fit a spacer of the determined thickness onto the pinion shaft

Fig. 76. I002689

Heat the taper roller bearing (14) to approx. 90°C and fit it to the pinion shaft

CAUTION: Risk of burns!

Fig. 77. I002714

Emplace the spur gear (13) in the transmission housing

Fig. 78. I002715

Press the oiled bearing outer ring of the taper roller bearing (14) into the transmission housing as far as it will go

Fig. 79. I002697

Press the oiled bearing outer ring of the taper roller bearing (11) into the transmission housing as far as it will go

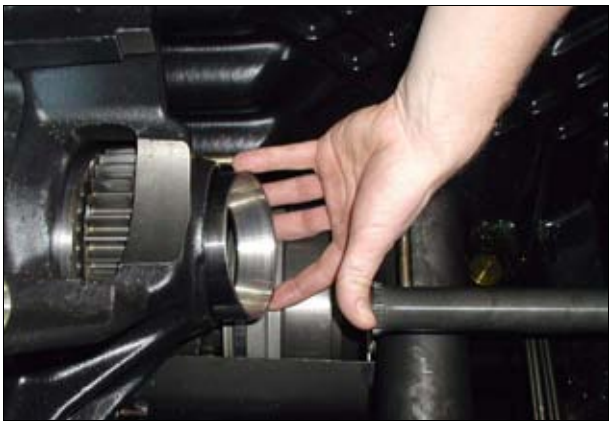

Fig. 80. I002698

Oil the taper roller bearing (14) and insert the pre-assembled pinion shaft into the transmission housing; thread the constant 4WD (spur gear) at the same time

Fig. 81. I002699

Fit the circlip (12)

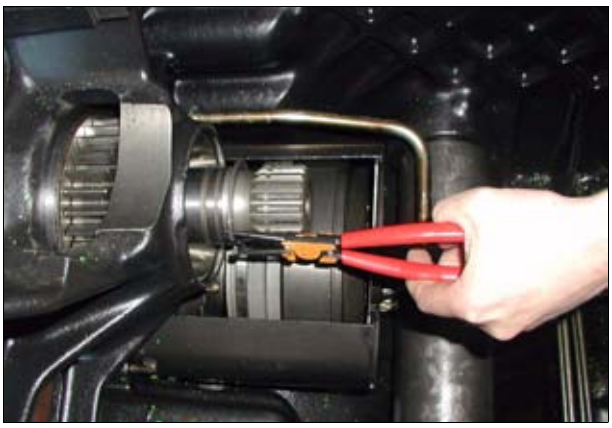

Fig. 82. I002700

Heat the taper roller bearing (11) to approx. 90°C and fit it to the pinion shaft, liberally oil the taper roller bearing

CAUTION: Risk of burns!

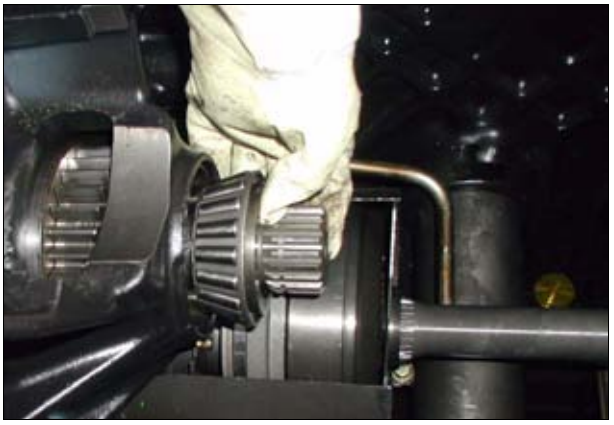

Fig. 83. I002701

Pre-tension the bearing with a drawing tool and threaded spindle

Fig. 84. I002702

Using a rotating device and torque gauge, check the roll resistance to be 2-6 Nm, adjust using a shim pack (8)

Fig. 85. I002736

Fit rings (6, 7) onto the pinion shaft (18)

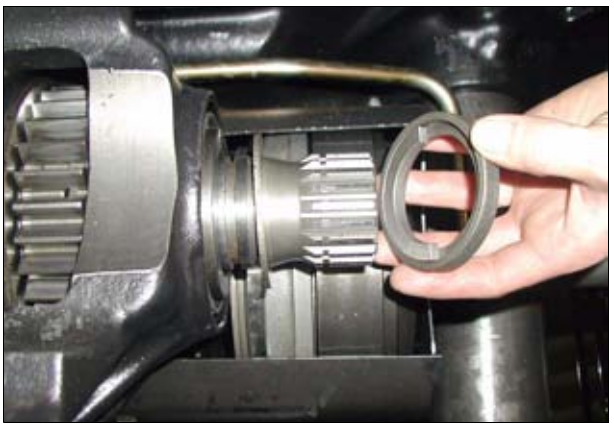

Fig. 86. I002704

Fit the circlip (5)

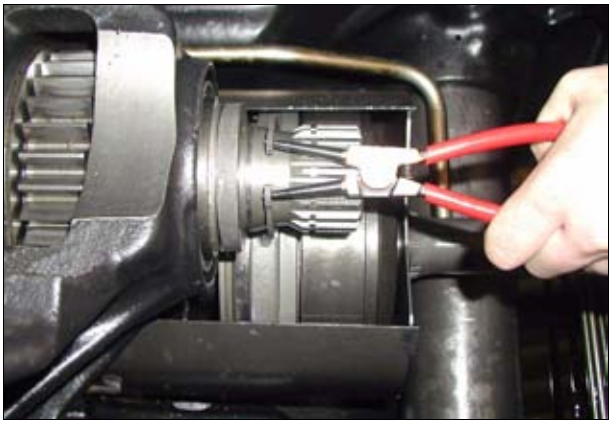

Fig. 87. I002705

Fit the oil trays (10, 15)

Fig. 88. I002706

7 Pinion shaft - ring gear backlash adjustment

Backlash adjustment calculation:

Calculation: Target dimension A = X - E - 0.2 mm

– X = Actual dimension, middle of pinion shaft to measurement surface of the rear axle housing (156)

– E = Adjustment dimension engraved on the ring gear

– 0.2 mm = Tooth play

Target dimension A = X - E - 0.2 mm	
Dimension X =	156.03
Dimension E =	81.01
Tooth play =	0.2
Specified dimension A =	74.82

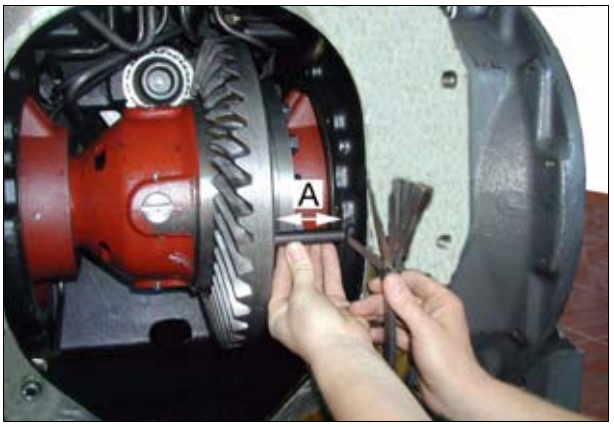

Fig. 89. I002716

Determining dimension X

The actual dimension is engraved on the flange surface of the rear axle housing

Fig. 90. I002707

NOTE: *Using a gauge block of 74.00 mm (self-made) und a feeler gauge, determine dimension A If there is a variation from the target dimension, adjust the dimension by changing the shim (tolerance $^{+0.05}$).*

If dimension A is not correct, change the shims

Fig. 91. I002676

Checking the wear pattern

Coat the sides of six to eight of the ring gear teeth with gear marking compound

Fig. 92. I002682

Clean the sealing surfaces, apply sealing compound X903.050.074.000, mate the rear axle housing and the transmission housing, and screw together

Tightening torque: **295 Nm** for M16

Tightening torque: **580 Nm** for M20

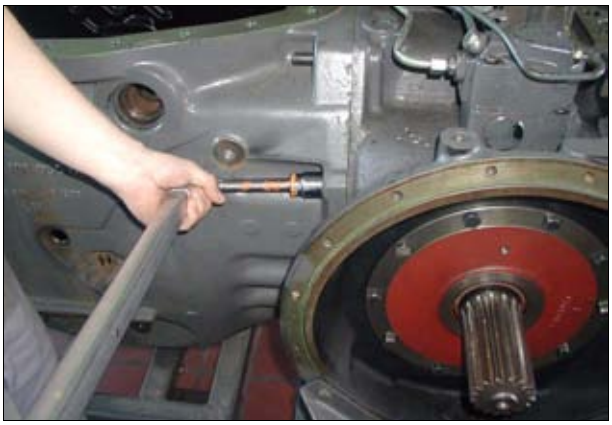

Fig. 93. I002683

Screw bolt M16 into the pinion shaft and lock it. Rotate the ring gear using the pinion shaft several times in both directions

Check the ring gear and pinion shaft wear pattern through the opening in the housing.

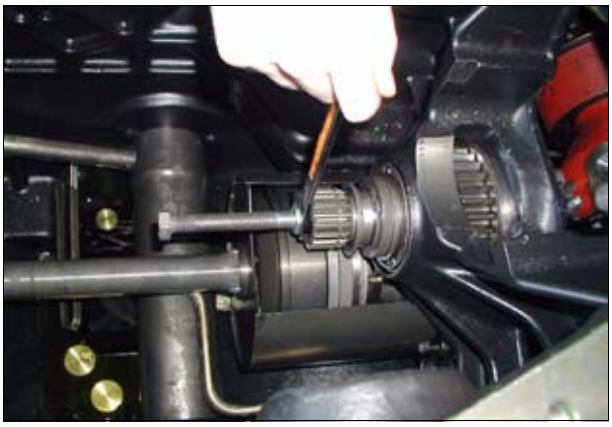

Fig. 94. I002684

Correct wear pattern for Gleason toothing:

A = Ring gear flank (pull)
B = Ring gear flank (push)

If the wear pattern is wrong, correct the pinion shaft distance accordingly

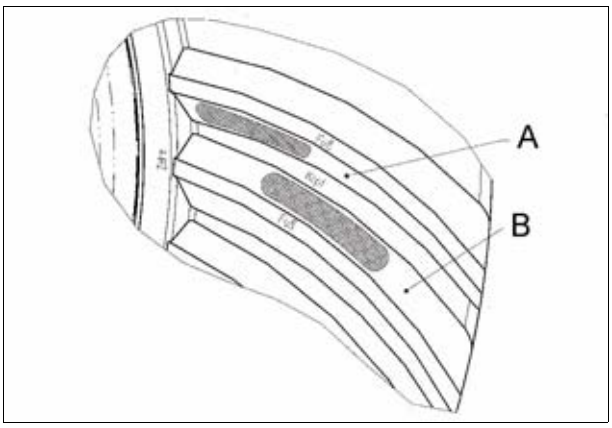

Fig. 95. I002718

Screw the measuring device (self-made) into the pinion shaft and fit the measuring scale
Set the measuring scale 34 mm from the middle of the pinion shaft

Determine backlash in four positions.
Target value = 0.2 mm + 0.05

Fig. 96. I002710

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

1015

Transmission/axle drive

1015 Transmission/axle drive

G Repair. 5

G Repair

1 Dismantling and reassembling axle drive 7

1 Dismantling and reassembling axle drive

Technical drawing of axle drive (flange axle)

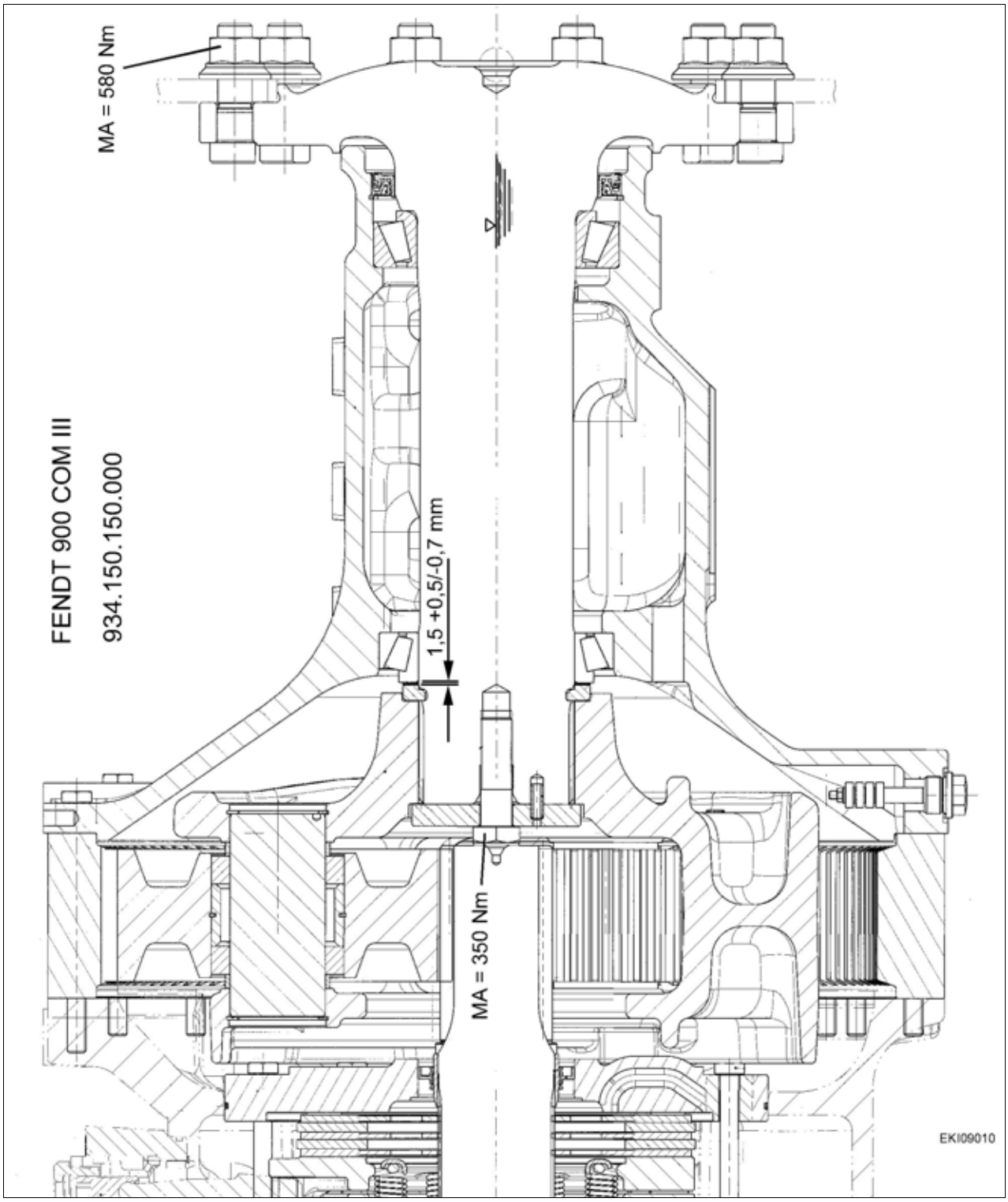

Fig. 1. I003576

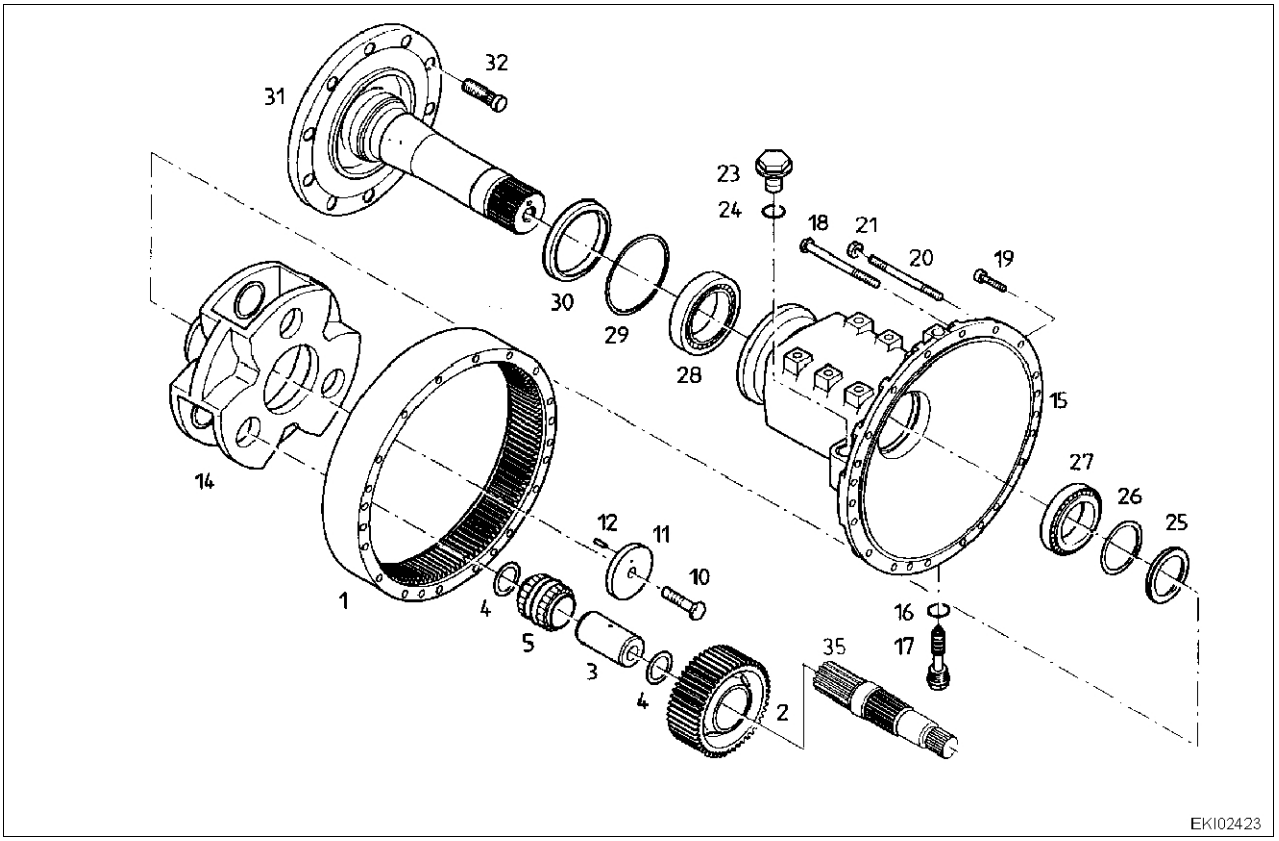

Fig. 2. I003577

Item	Designation	Item	Designation
1	Internal gear	20	Stud bolt M12 x 165 - 10.9
2	Spur gear	21	Hex. nut M12-10
3	Axle	23	Screw plug M30 x 1.5
4	Circlip	24	Seal ring
5	Cylinder roller ring	25	Ring
10	Hex screw	26	Shim
11	Plate	27	Taper roller bearing
12	Dowel pin	28	Taper roller bearing
14	Planetary carrier	29	Snap ring
15	Axle housing	30	Shaft seal ring
16	Seal ring	31	Rear axle shaft
17	Magnetic plug	32	Wheel bolt
18	Hex. screw M12 x 160-10.9	35	Shaft
19	Socket head cap screw		

Technical drawing of axle drive (stub shaft axle)

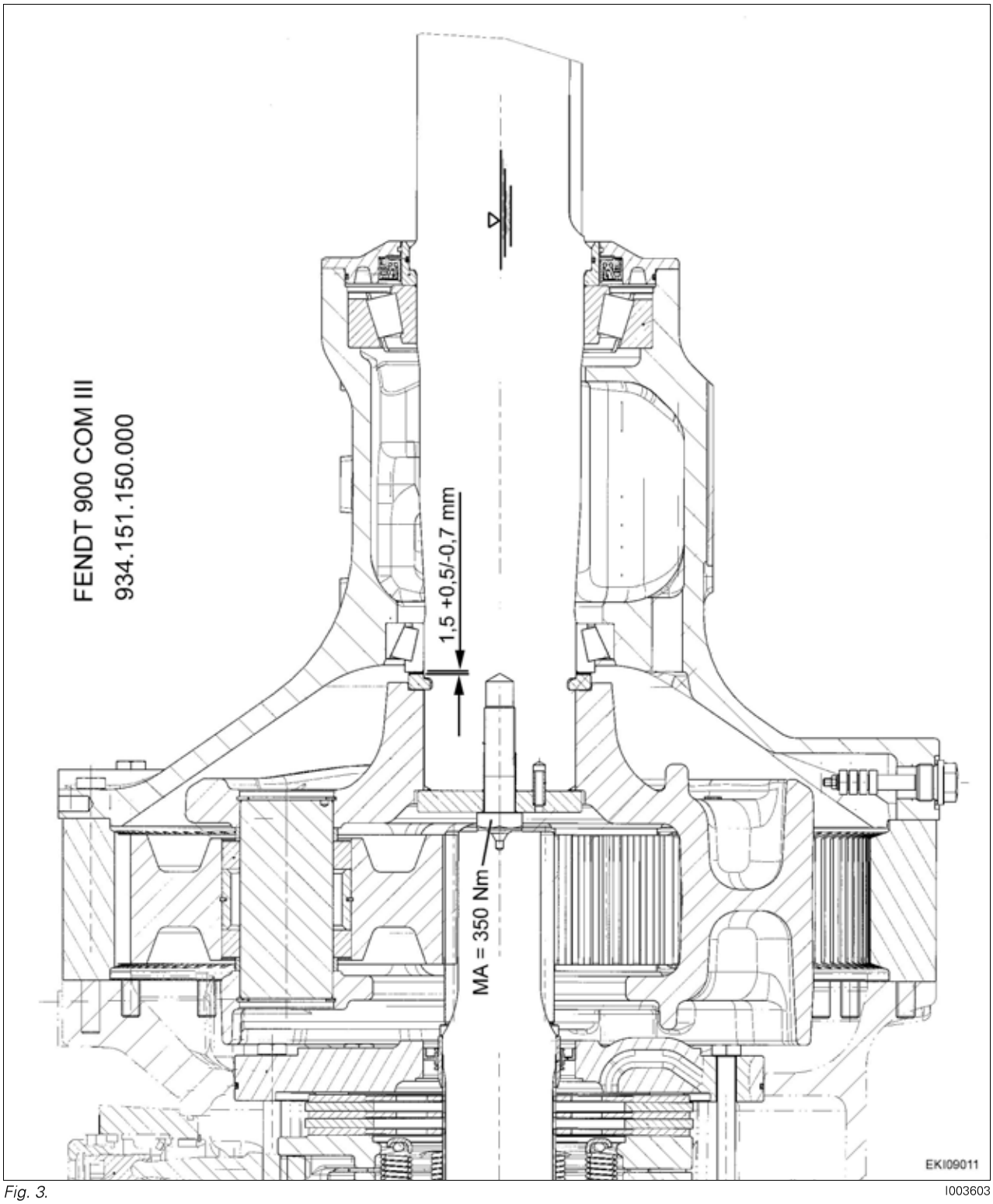

Fig. 3. I003603

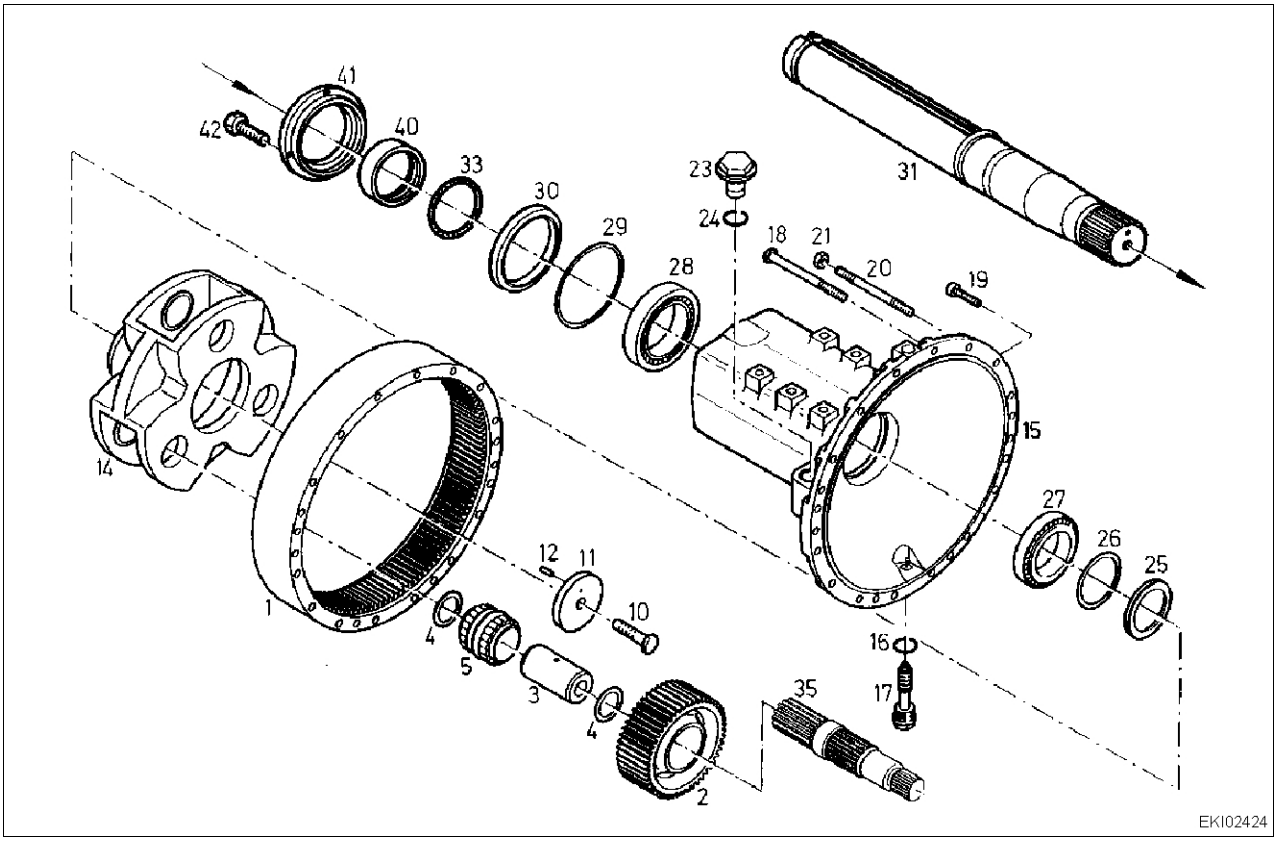

Fig. 4. I003604

Item	Designation	Item	Designation
1	Internal gear	21	Hex. nut M12-10
2	Spur gear	23	Screw plug M30 x 1.5
3	Axle	24	Seal ring
4	Circlip	25	Ring
5	Cylinder roller ring	26	Shim
10	Hex screw	27	Taper roller bearing
11	Plate	28	Taper roller bearing
12	Dowel pin	29	Snap ring
14	Planetary carrier	30	Shaft seal ring
15	Axle housing	31	Rear axle shaft
16	Seal ring	33	O-ring
17	Magnetic plug	35	Shaft
18	Hex. screw M12 x 160-10.9	40	Spacer
19	Socket head cap screw	41	Cover
20	Stud bolt M12 x 165 - 10.9	42	Hex screw

Dismantling axle drive

NOTE: *The task is carried out on the axle drive (flange). Logical repair of axle drive (stub shaft).*

Preliminary work:
Remove the axle drive concerned

Screw out socket head cap screws (19) by approx. 10 mm and lightly tap the ring gear (1) back

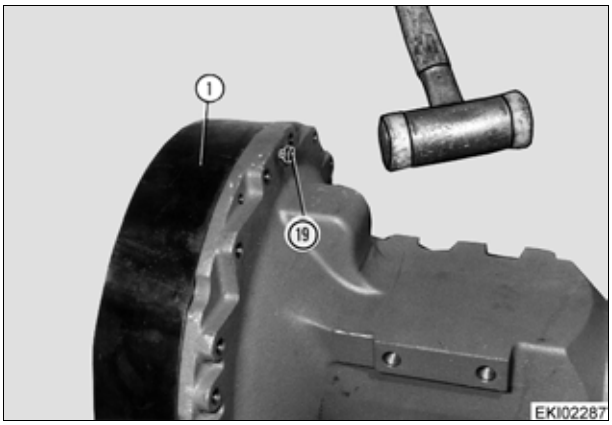

Fig. 5. I003605

Screw out the hex screw (10) and remove the planetary carrier

NOTE: *The hex screw (10) is fixed with synthetic bonding agent!*

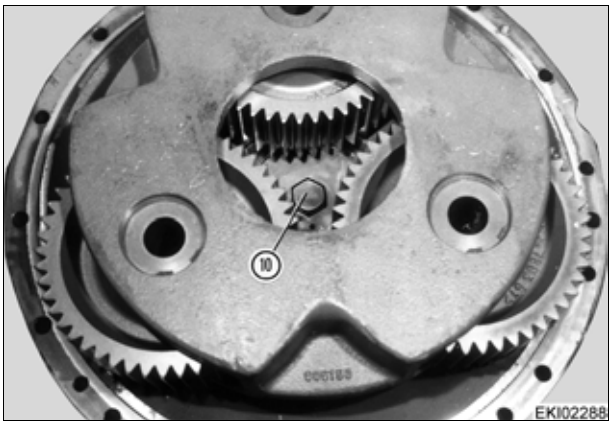

Fig. 6. I003609

If necessary:

Unclip circlip (4).
Press out the axle (3)
Remove the spur gear (2)
Fit the spur gears (2)

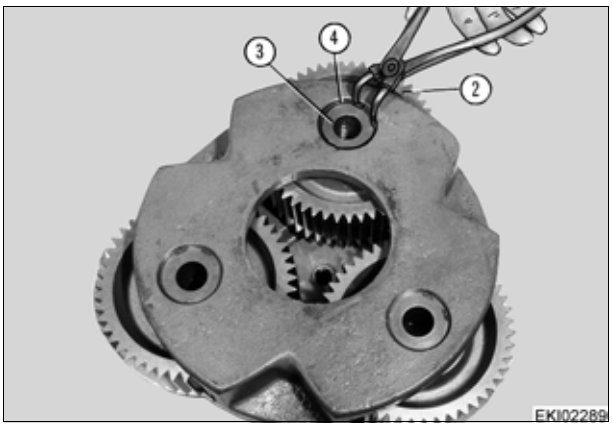

Fig. 7. I003610

Pre-tension the rear axle shaft bearing

Place one or two shims, order no. X534.739.501 (thickness: 1mm each) onto the rear axle shaft (31).
Then re-fit the planetary carrier.

NOTE: *If no shims are available, the rear axle shaft bearing can also be pre-tensioned using a (self made) clamping bush.*

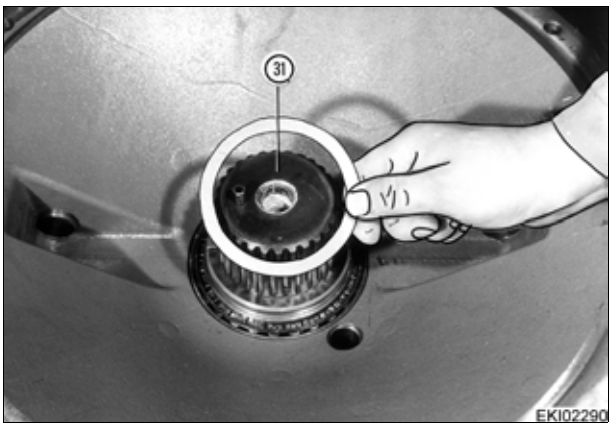

Fig. 8. I003611

Pre-tension the rear axle shaft bearing with the hex screw (10).
Remove the planetary carrier (14) once more.

NOTE: *Do not turn the rear axle shaft (31)!*

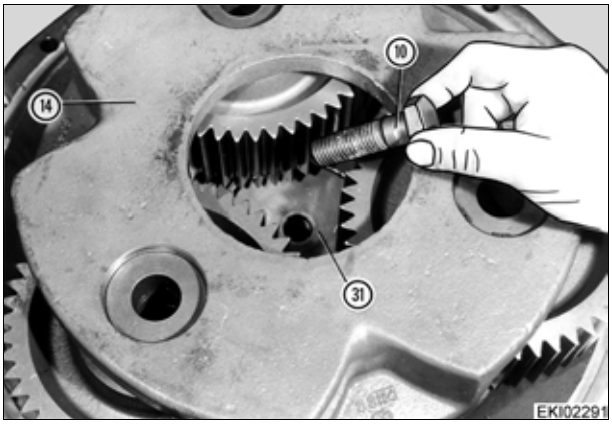

Fig. 9. I003612

Press the sectioned ring (25) out of the rear axle shaft (31) groove
Remove shims
Withdraw the dowel pin (12)

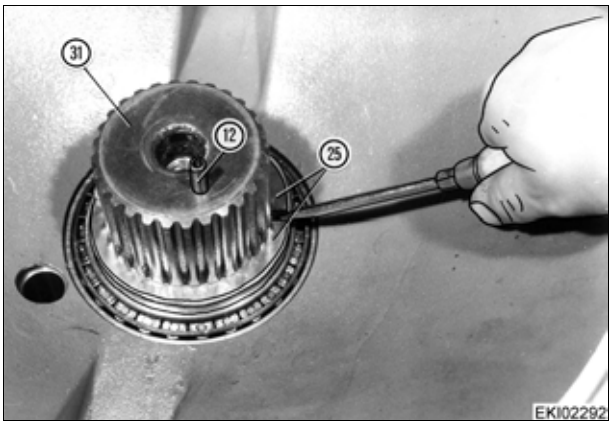

Fig. 10. I003613

Attach the protective cap X 899.980.157.000 to the rear axle shaft

Fig. 11. I003614

Attach assembly clamps (self made, see picture) to the rear axle shaft (31).
Force the rear axle shaft out (31) by knocking on a metal block.

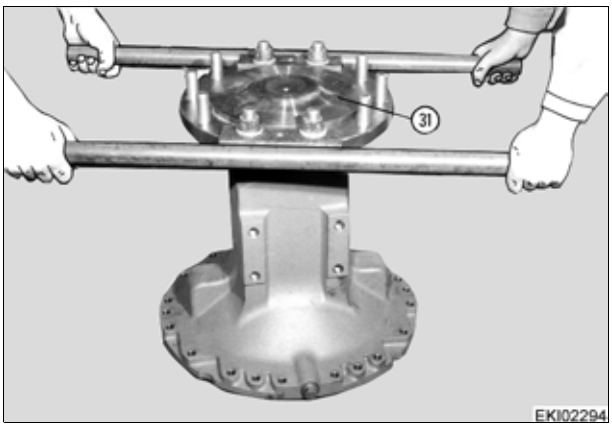

Fig. 12. I003615

Withdraw the inner ring from the taper roller bearing (28) using X899.980.159.000 extraction tool.
Then push the shaft seal ring (30) off.

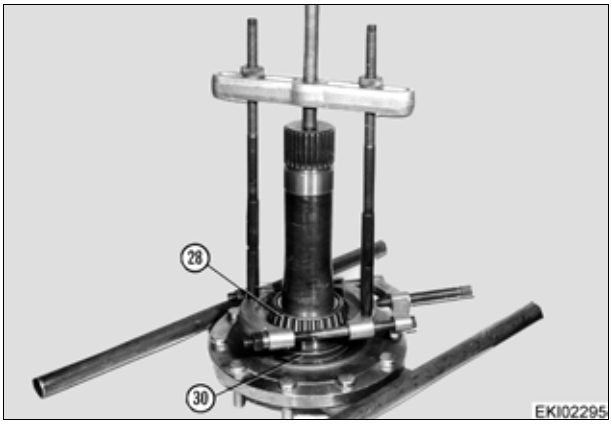

Fig. 13. I003616

Assembling axle drive

Assembly:

Where removed:
Press the outer ring of the taper roller bearing (28) in as far as it will go.
Emplace the snap ring (29) into the groove.
On the opposite side, press the outer ring of the taper roller bearing in as far as it will go.

Fig. 14. I003617

Heat the inner ring of the taper roller bearing (28) to approx. 80°C and place it in the axle housing (15).

Coat the outside of the shaft seal ring (30) with sealing compound X903.051.711, and the inside with a (1:1) spirit/water mixture and press it in as far as it will go.

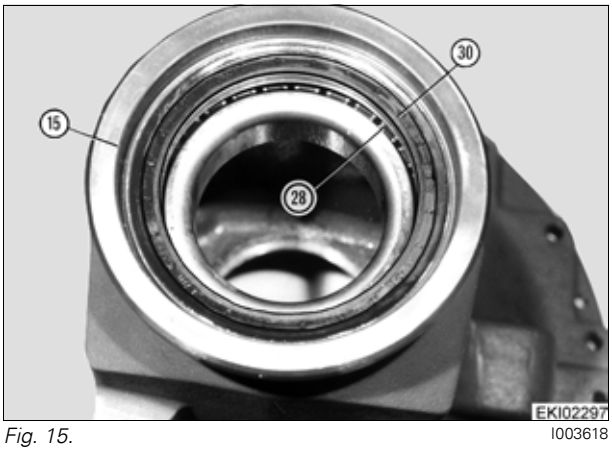

Fig. 15. I003618

Before the inner ring cools down, insert the rear axle shaft (31) with the assembly clamps (self made, see picture) attached as far as it will go.

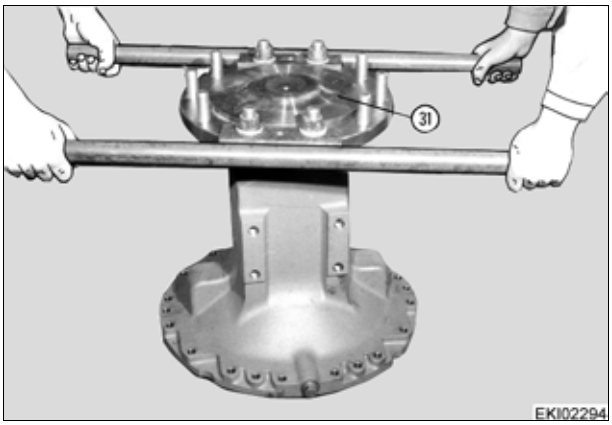

Fig. 16. I003615

Turn the axle housing (15) round.
Heat the inner ring of the taper roller bearing (27) to approx. 80°C and press it on as far as it will go.
Lubricate the rear axle shaft bearing with transmission oil.

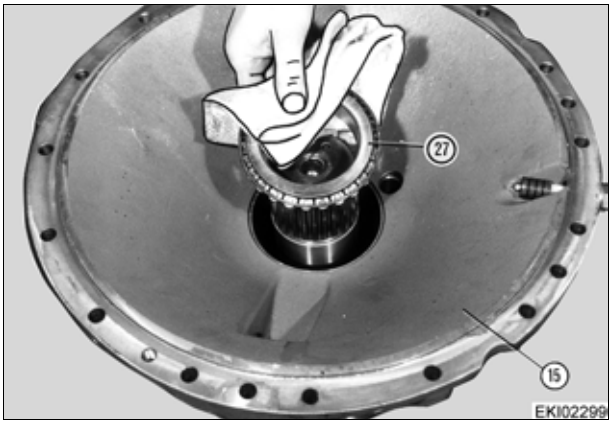

Fig. 17. I003620

Support the axle housing (15) from below.
There must be slight play in the rear axle shaft bearing.

Attach the torque gauge X899.980.150.000 and measure and note the torque resistance of the shaft seal ring, e.g. 5.0 Nm.

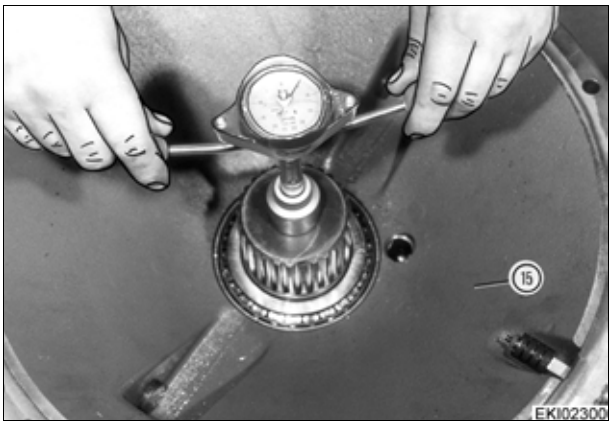

Fig. 18. I003621

Select the thickness of the shims (26) so that the sectioned ring has no play once in place.

NOTE: *If possible, emplace the shims (26) so that the 1.0 mm thick shim (26) faces the sectioned ring (25).*

Fig. 19. I003622

Place two shims, order no. X534.739.501, (thickness: 1.0 mm each) onto the rear axle shaft (31).
Then attach and tighten the planetary carrier.
The torque resistance of the rear axle shaft bearing must increase.

NOTE: *If the torque resistance does not increase, remove the planetary carrier once again and insert further shims (26) beneath the sectioned ring (25).*
Then pre-tension the rear axle shaft bearing once more.

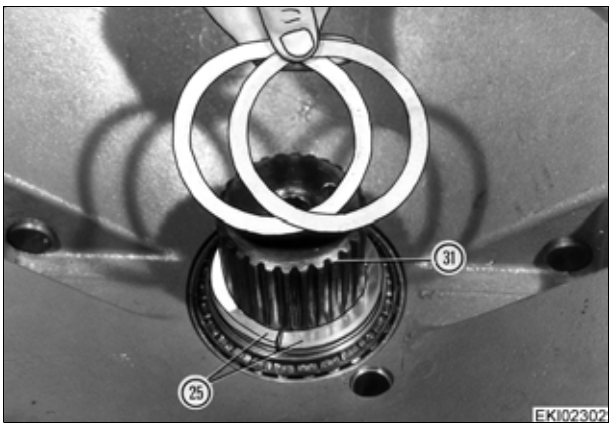

Fig. 20. I003623

Lightly tap the bearing in both directions, thus releasing its tension.
Remove the planetary carrier once more.
Select a shim (26) thickness that enables the sectioned ring (25) to be pushed in by light tapping with a hammer.
Insert the dowel pin (12) into the rear axle shaft (31).

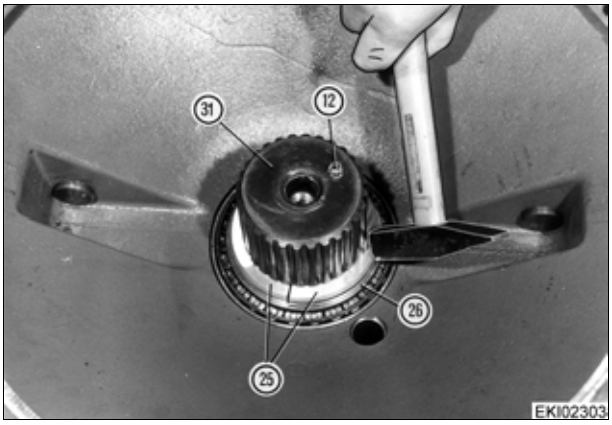

Fig. 21. I003624

Coat the threads of the hex screw (10) with synthetic bonding agent X903.050.084 and tighten to a torque of **350 Nm .**

Lightly tap the bearing in both directions, thus releasing its tension.

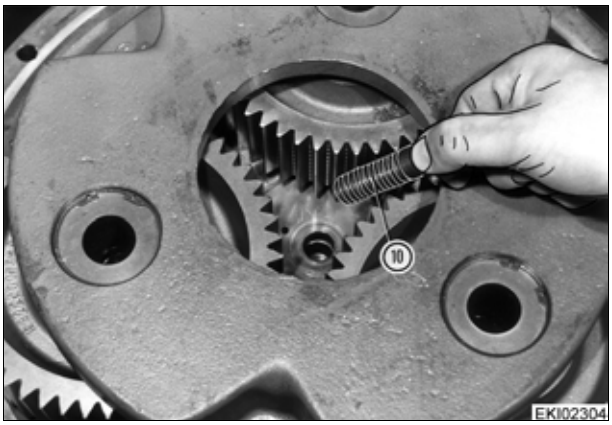

Fig. 22. I003625

Measure and note the torque resistance of the shaft seal ring and bearing with torque gauge X899.980.150.

Target value: 4.0 to 6.0 Nm (bearing) + torque resistance (shaft seal ring e.g. 5.0 Nm).

If there is any deviation correct the torque resistance with shims (26).

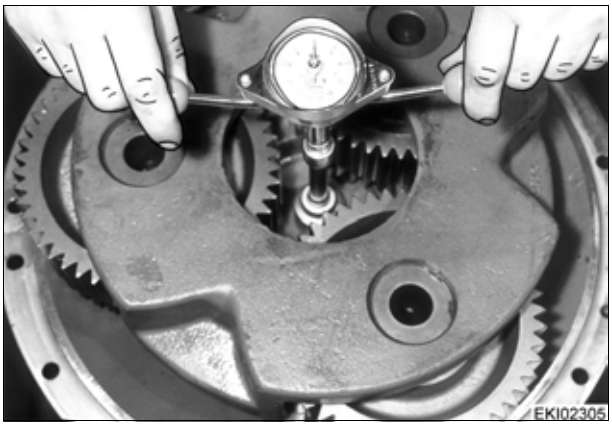

Fig. 23. I003626

Check the axial play of the planetary carrier (14) with two mounting levers.
Target value: 0.2 to 0.5 mm axial play.

NOTE: *Important – some axial play must be present.*

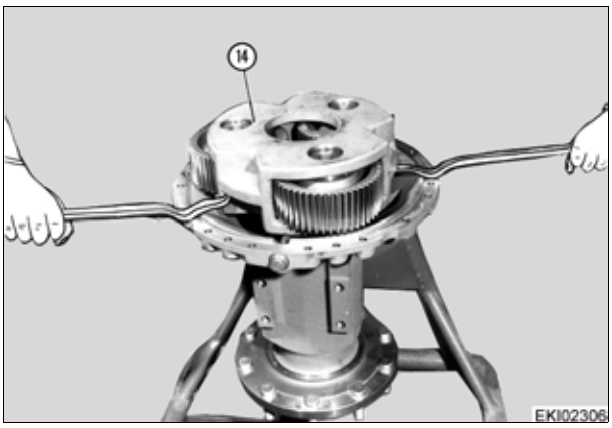

Fig. 24. I003627

If dismantled, attach the planet wheels.

Emplace the snap ring onto the groove of the bush and press the bush (arrow) into the spur gear (2) (planet wheel) until the snap ring engages.

NOTE: *The bush (arrow) cannot be dismantled.*

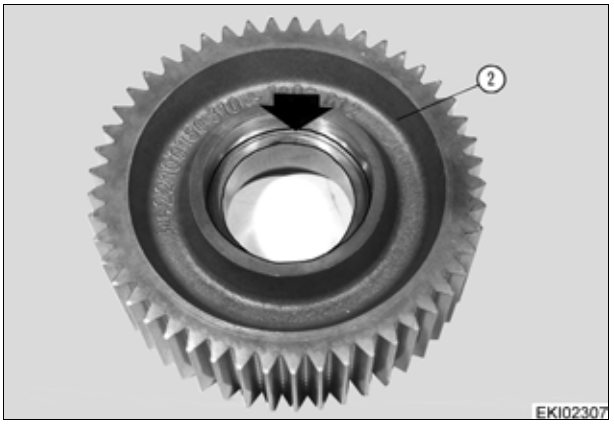

Fig. 25. I003628

Using grease, stick the 19 rollers from the drum (5) into the spur gear (2).
Then stick the drum (5) ring with grease into the spur gear (2).
Pre-assemble the other side of the spur gear (2) logically.

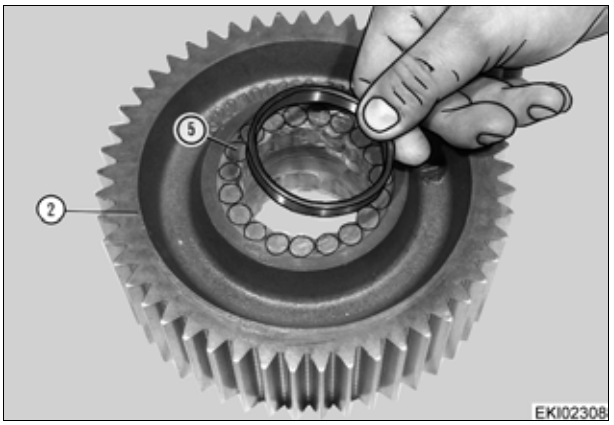

Fig. 26. I003629

Place the circlip (4) into the groove of the planetary carrier (14).

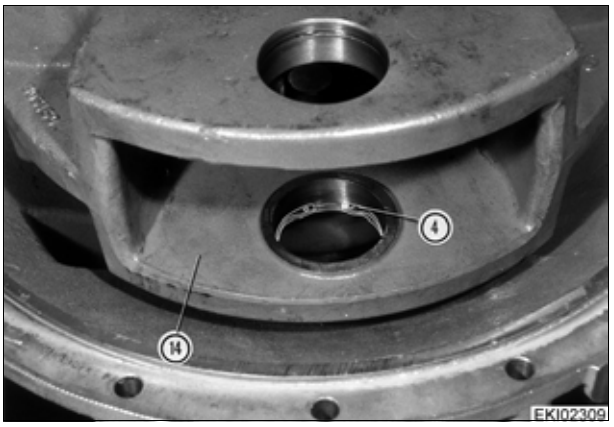

Fig. 27. I003630

Insert the pre-assembled spur gear (2).
Insert the axle (3) and circlip (4) into the groove in the planetary carrier (14).

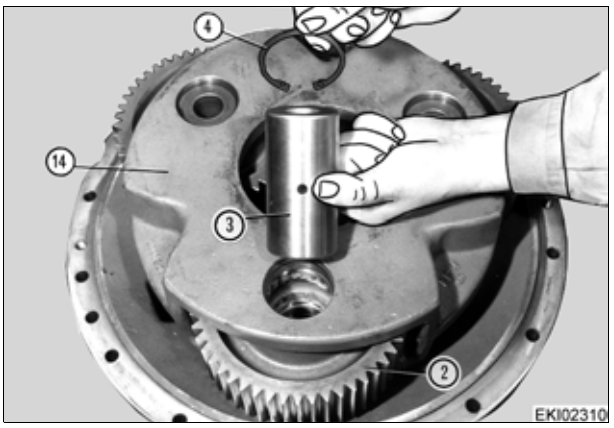

Fig. 28. I003631

Clean the flange surface and then coat it with flange sealant X903.050.074.

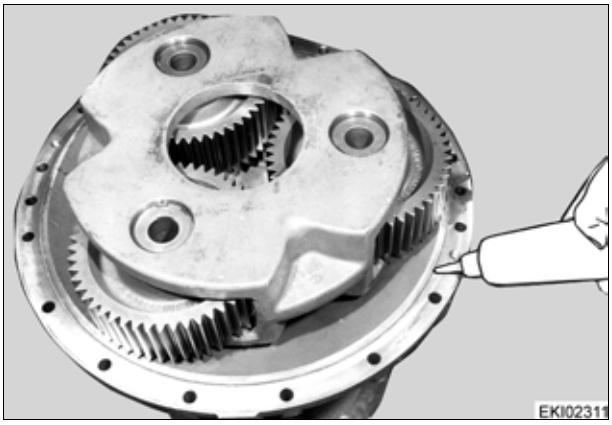

Fig. 29. I003632

Attach the ring gear (1).
Tighten the socket head cap screws (19) to a torque of 86 Nm.

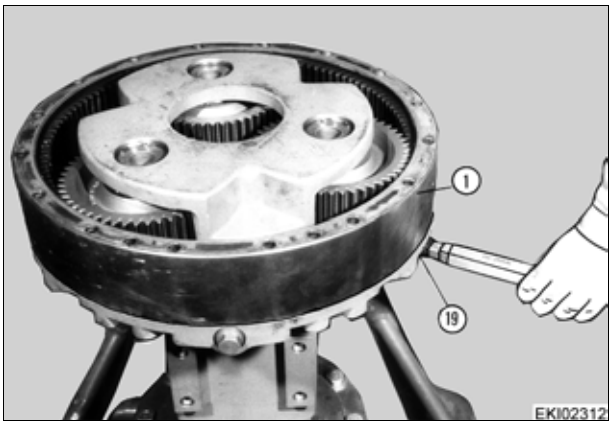

Fig. 30. I003633

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E	Testing
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G	Repair
H	Service – Info

1050

Transmission/housing

1050 Transmission/housing

G Repair 5

G Repair

1 Separating tractor – engine and clutch housing 7
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1 Separating tractor – engine and clutch housing

Preliminary work:

- Lower the tractor completely at the front
- Safely jack up the tractor and remove the wheels
- Drain the coolant.
- Drain hydraulic oil.
- Siphon off the fuel
- Disconnect the battery
- Remove all panels necessary

Relieve pressure on the front axle suspension accumulator (open both suspension lock valves)

Fig. 1. I003206

Remove the battery, battery box and cable board

Fig. 2. I003502

Remove fuel tank on the right

Fig. 3. I003487

Loosen the shaped brackets and remove the exhaust silencer

Fig. 4. I001408

Loosen both shaped brackets

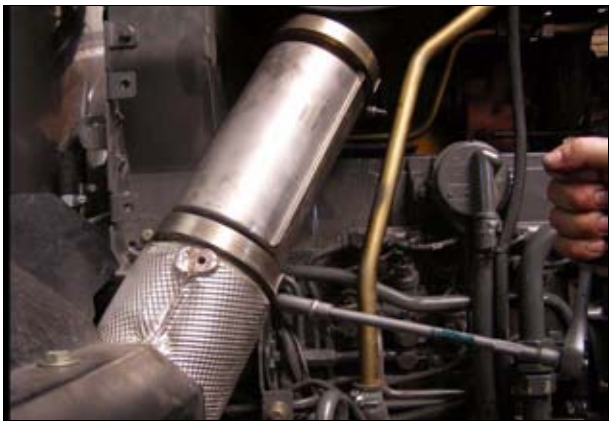

Fig. 5. I003483

Remove the intermediate pipe

Fig. 6. I003482

Loosen the bolts and remove the exhaust pipe

Fig. 7. I003488

Remove the earth cable on the right hand side of the engine

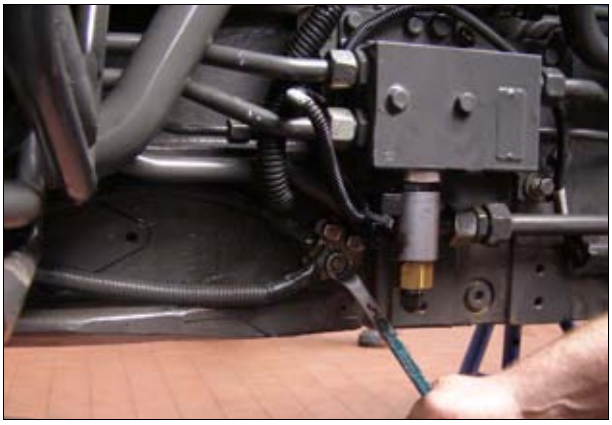

Fig. 8. I003481

Unplug all connections on the right hand side of the engine and secure the cable set to the central control block

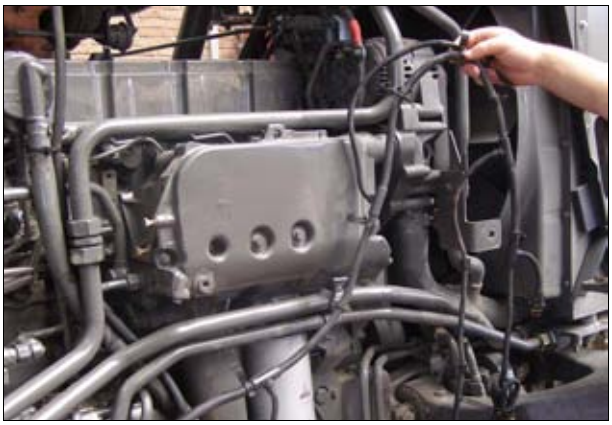

Fig. 9. I003480

Unplug all connections around the engine control unit and secure the cable set to the central control block

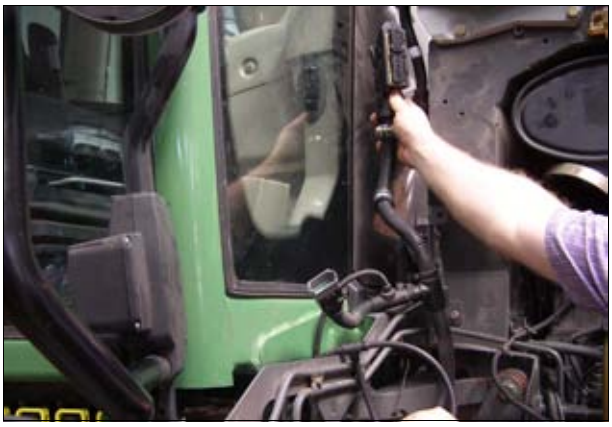

Fig. 10. I003476

Remove the fuel pipe

Fig. 11. I003479

Remove the auxiliary pump suction line

Fig. 12. I003475

Loosen the hydraulic piping to the auxiliary pump

Fig. 13. I003474

Loosen the hydraulic piping to the auxiliary pump flow monitor and remove the hydraulic piping

Fig. 14. I003473

Loosen the air piping on the compressor

Fig. 15. I003472

Loosen the air piping at the screw coupling and remove the piping

Fig. 16. I003470

Loosen the fuel pipe to the Sepra filter

Fig. 17. I003478

Loosen the fuel pipe to the engine and remove the pipe

Fig. 18. I003477

Loosen the hydraulic piping to the radiator plate

Fig. 19. I003417

Loosen the hydraulic piping to the oil temperature regulator and remove the piping

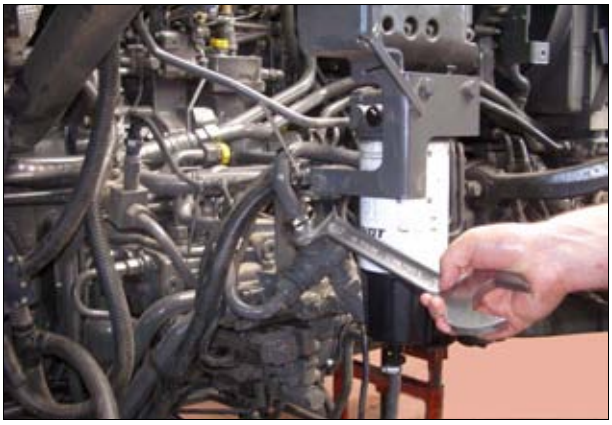

Fig. 20. I003469

Loosen the hydraulic piping to the transmission oil cooler

Fig. 21. I003468

Loosen the hydraulic piping to the transmission oil cooler

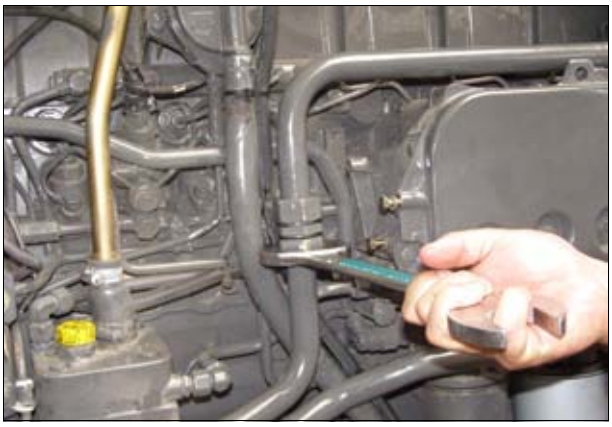

Fig. 22. I003467

Loosen the hydraulic piping to the pressure-limiting valve

NOTE: *May vary according to the tractor equipment configuration*

Fig. 23. I003466

Loosen the hydraulic piping to the oil temperature regulator and remove the piping

Fig. 24. I003465

Remove the banjo bolt on the front EPC valve

NOTE: *May vary according to the tractor equipment configuration*

Fig. 25. I001656

Loosen the hydraulic piping to the front DA pressure-limiting valve and remove the piping

NOTE: *May vary according to the tractor equipment configuration*

Fig. 26. I003464

Remove the hydraulic piping to the central control valves

NOTE: *May vary according to the tractor equipment configuration*

Fig. 27. I003463

Separate the hydraulic piping at the screw coupling

Fig. 28. I003462

Separate the front axle hydraulic piping at the screw coupling

Fig. 29. I003461

Remove the compressed air tank on the left rear axle

Fig. 30. I003456

Remove the bracket on the left fuel tank

Fig. 31. I003455

Remove the left fuel tank

Fig. 32. I003454

Remove the starter cable

Fig. 33. I003453

Unplug all connections on the left side of the engine and secure the cable set to the transmission

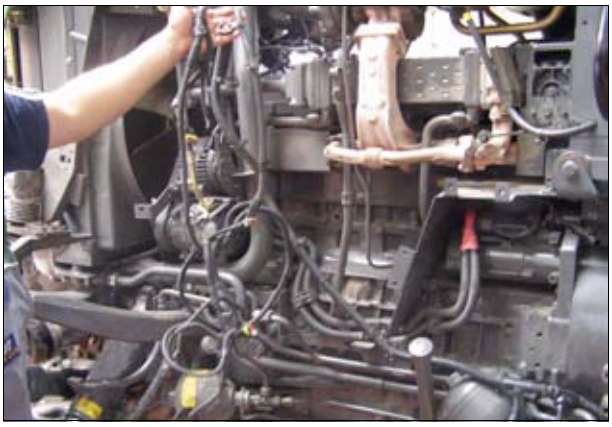

Fig. 34. I003452

Remove the panel between the clutch housing and the transmission housing

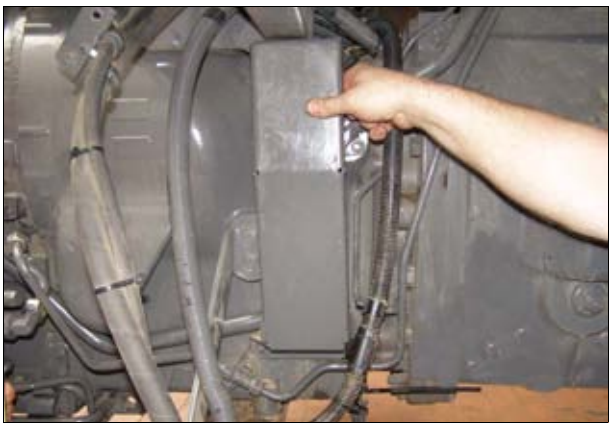

Fig. 35. I003451

Loosen all hydraulic piping to the front axle suspension valve block

Fig. 36. I003447

Loosen the front axle valve block bolts

Fig. 37. I003446

Remove the front axle valve block

Fig. 38. I003445

Loosen the hydraulic piping to the radiator plate

Fig. 39. I003202

Loosen the return line from the hydraulic oil cooler to the screw coupling and remove the piping

Fig. 40. I003503

Separate the hydraulic piping from the steering and front hydraulics to the screw coupling

Fig. 41. I003444

Carefully take the weight of the cab and slightly raise it

Remove the hex. bolt from the cab suspension

Fig. 42. I001472

Remove the hex. bolt from the shock absorber

Fig. 43. I001431

Loosen hose clamps and remove the heating hoses.

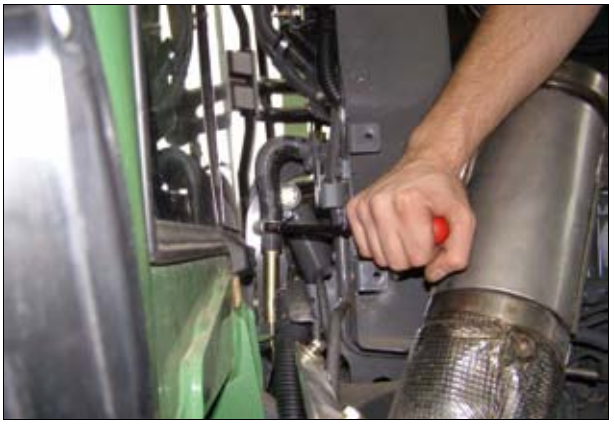

Fig. 44. I001423

Remove the hex. bolts from the left and right of the cab suspension

Fig. 45. I001430

Remove the hydraulic oil filler neck

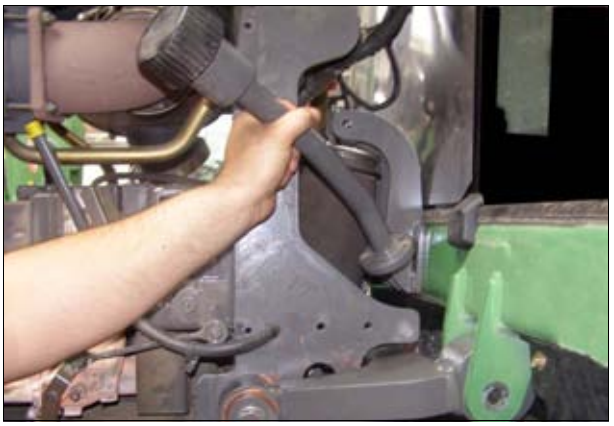

Fig. 46. I003443

Remove the fuel pipe

Fig. 47. I003442

Fit the front wheels, place an assembly trolley under the engine and an assembly trestle under the clutch housing or the transmission housing

Loosen the flange bolts between the engine and clutch housing at the left, right and top

NOTE: *Do not remove the M20 hex. bolts (arrowed) on the left and right, as these hold the flywheel housing!*

Fig. 48. I003492

Separate the engine and clutch housing

NOTE: *Ensure there is sufficient clearance between all components.*

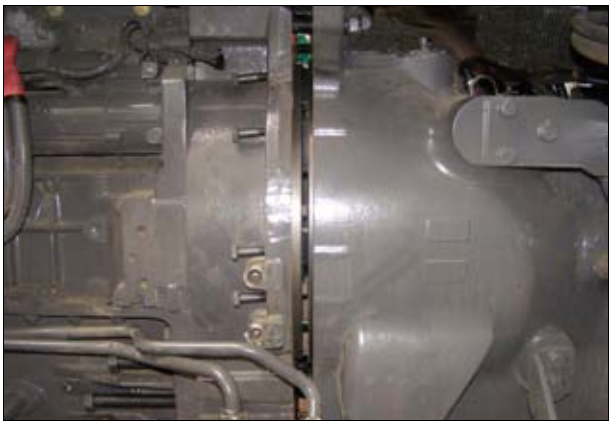

Fig. 49. I003434

2 Assembling tractor - engine and clutch housing

Present the engine to the tractor frame

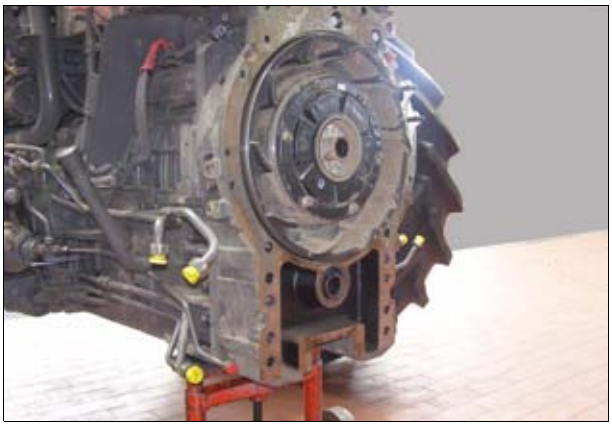

Fig. 50. I003439

Face the engine onto the clutch housing,
ensuring that no hydraulic piping is snagged

NOTE: *Ensure that the teeth of the drive shaft and the 4WD shaft fit the bushes.*
If these are not aligned, turn either the engine of the rear axle shaft

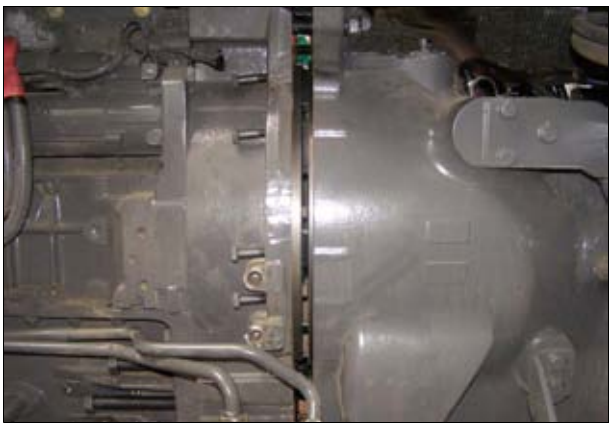

Fig. 51. I003434

Tighten the M20 bolts
Tightening torque: 580 Nm

Fig. 52. I003440

Tighten M12 and M16 bolts
Tightening torque: M12 = 120 Nm
Tightening torque: M16 = 315 Nm

Fig. 53. I003441

Fit the fuel pipe from right to left

Fig. 54. I003442

Fit the hydraulic oil filler neck, replace the O-ring if necessary

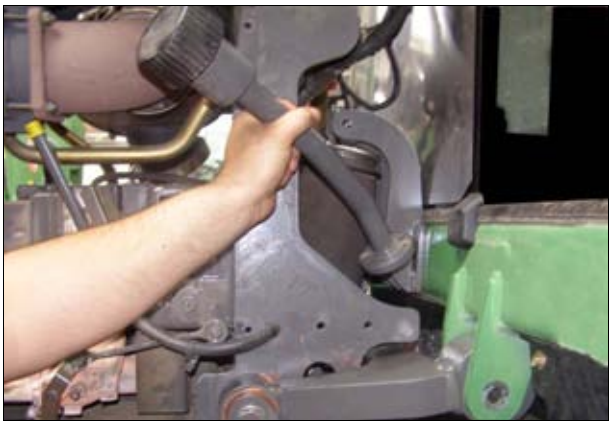

Fig. 55. I003443

Lower the front of the cab,
fit one hex. bolt to both the left and right front cab bearing
Tightening torque: 206 Nm

Fig. 56. I001430

Fit the heater hoses using hose clamps.

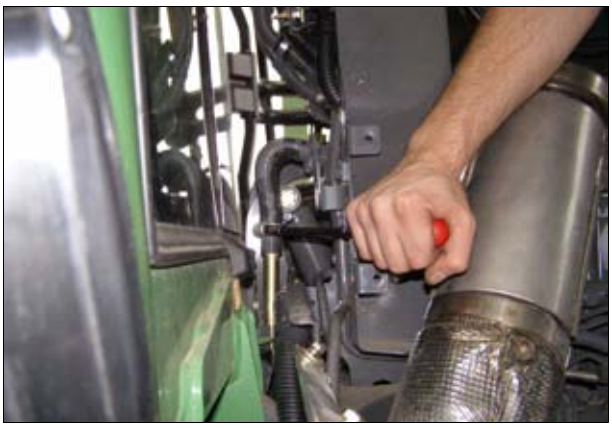

Fig. 57. I001423

Fit the shock absorber hex. bolt
Tightening torque: 85 Nm

Fig. 58. I001431

Fit the front cab suspension hex. bolt.
Tightening torque: 85 Nm

Fig. 59. I001472

Tighten the hydraulic piping for the steering and front hydraulics on the left side of the tractor

Fig. 60. I003444

Fit the hydraulic piping from the radiator plate to the return screw coupling

Fig. 61. I003450

Tighten the hydraulic piping to the return screw coupling

Fig. 62. I003503

Tighten the hydraulic piping to the radiator plate

Fig. 63. I003202

Fit the front axle suspension valve block

Fig. 64. I003445

Tighten the front axle valve block bolts

Fig. 65. I003446

Fit and tighten all hydraulic piping to the front axle suspension valve block

Fig. 66. I003447

Fit the panel between the clutch housing and transmission housing

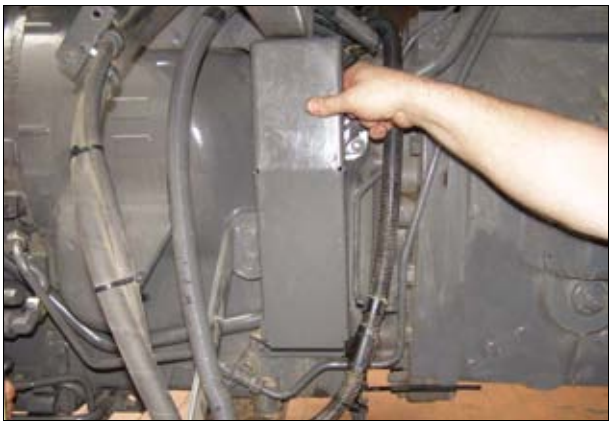

Fig. 67. I003451

Fit the cable set to the left side of the engine and plug in all connections

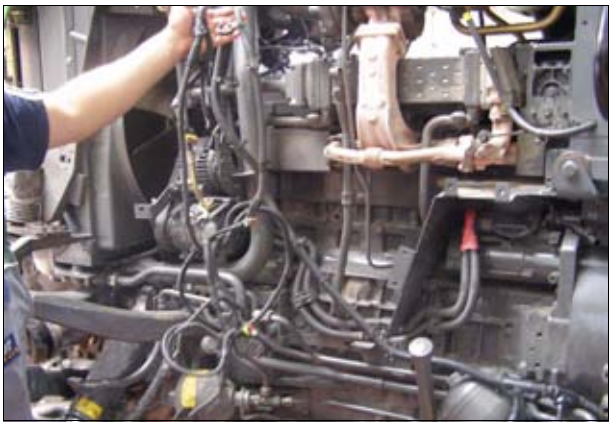

Fig. 68. I003452

Fit the starter cable

Fig. 69. I003453

Fit the left fuel tank

Fig. 70. I003454

Secure the left fuel tank with the retaining strap and bracket

Fig. 71. I003455

Secure the compressed air reservoir on the left rear axle with the retaining strap

Fig. 72. I003456

Tighten the hydraulic piping to the front hydraulics

Fig. 73. I003460

Tighten the hydraulic piping to the front axle

Fig. 74. I003461

Tighten the hydraulic piping

Fig. 75. I003462

Fit and tighten the hydraulic piping for the front connections

NOTE: *May vary according to the tractor equipment configuration*

Fig. 76. I003463

Fit the hydraulic piping between the front EPC valve and the front DA pressure-limiting valve and tighten it to the latter

NOTE: *May vary according to the tractor equipment configuration*

Fig. 77. I003464

Tighten the banjo bolt on the front EPC valve

NOTE: *May vary according to the tractor equipment configuration*

Fig. 78. I001656

Fit the hydraulic piping between the oil temperature regulator and the front DA pressure-limiting valve and tighten it to the oil temperature regulator

Fig. 79. I003465

Tighten the hydraulic piping to the pressure-limiting valve

NOTE: *May vary according to the tractor equipment configuration*

Fig. 80. I003466

Fit and tighten the transmission oil cooler hydraulic piping

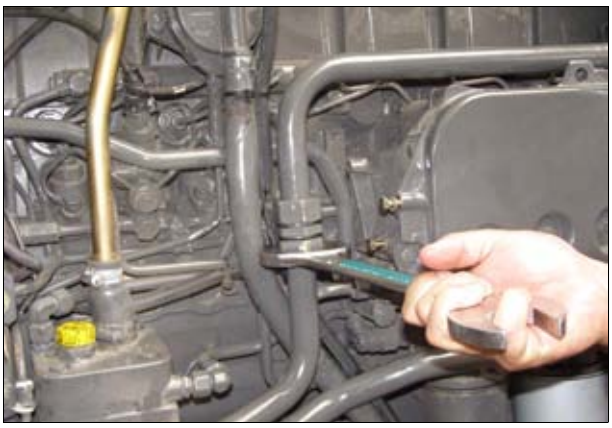

Fig. 81. I003467

Fit and tighten the transmission oil cooler hydraulic piping

Fig. 82. I003468

Fit the hydraulic piping between the oil temperature regulator and the radiator plate and tighten it to the oil temperature

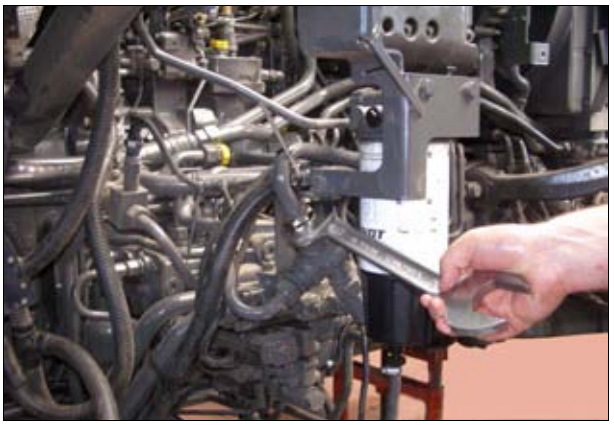

Fig. 83. I003469

Tighten the hydraulic piping to the radiator plate

Fig. 84. I003417

Fit the fuel pipe between the engine and the Sepra filter and tighten it to the engine

Fig. 85. I003477

Tighten the fuel pipe to the Sepra filter

Fig. 86. I003478

Fit the air piping between the compressor and the piping and tighten the connection

Fig. 87. I003470

Tighten the air piping to the compressor

Fig. 88. I003472

Fit the hydraulic piping between the auxiliary pump flow monitor and the auxiliary pump and tighten it at the flow monitor

Fig. 89. I003473

Tighten the hydraulic piping to the auxiliary pump

Fig. 90. I003474

Fit and tighten the suction line between the auxiliary pump and the piping

Fig. 91. I003475

Fit the cable set to the engine control unit and plug in all connections

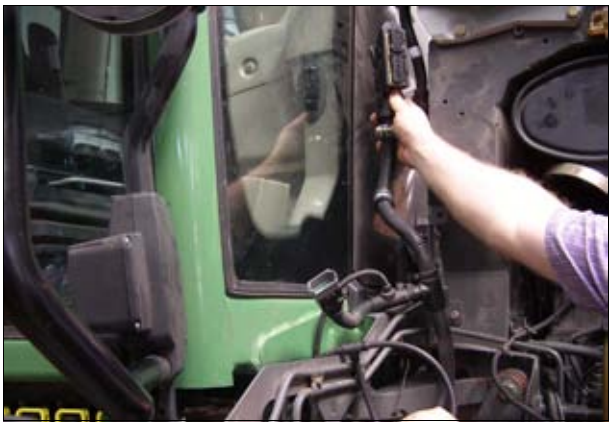

Fig. 92. I003476

Fit and tighten the fuel pipe

Fig. 93. I003479

Fit the cable set to the right side of the engine and plug in all connections

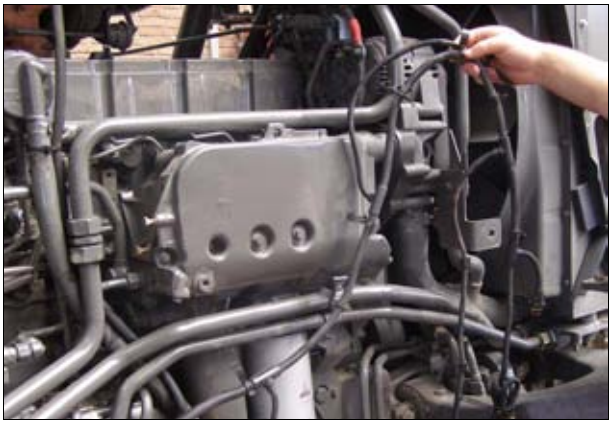

Fig. 94. I003480

Fit the earthing strip to the right side of the engine

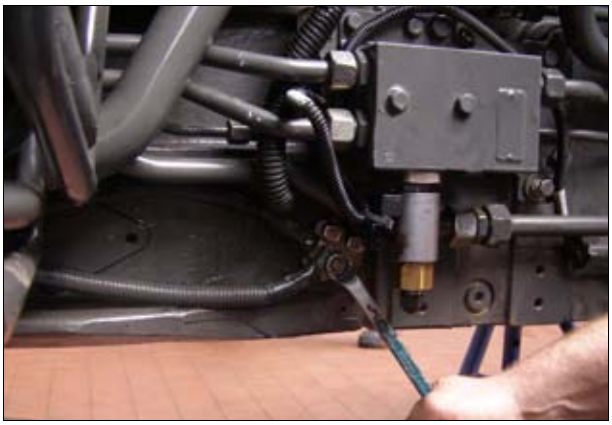

Fig. 95. I003481

Fit the exhaust pipe and tighten the screws

Fig. 96. I003488

Fit the intermediate pipe using the two shaped brackets

Fig. 97. I003482

Tighten both shaped brackets

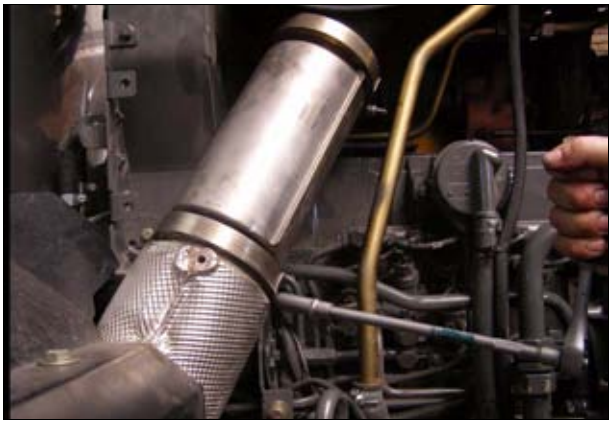

Fig. 98. I003483

Fit the exhaust silencer using the shaped brackets and tighten them

Fig. 99. I001408

Mount fuel tank on right

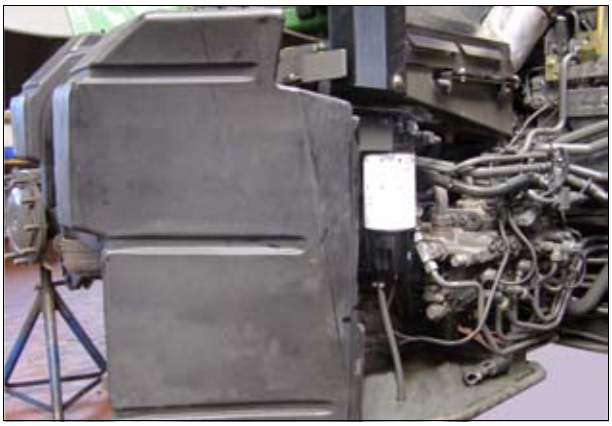

Fig. 100. I003487

Fit the battery box, cable plate and battery

Fig. 101. I003502

Screw in and tighten the front axle suspension lock valves

Fig. 102. I003206

Final procedures:

– Fit and clamp the battery
– Fit all panels
– Top up coolant water
– Fill up hydraulic oil
– Fill up fuel
– Fit the wheels

A	General
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Transmission / Brake system

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C Documents and diagrams

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3 Technical drawing of the wheel brake cylinder 13

1 Technical drawing of the rear wheel brake

Rear wheel brake

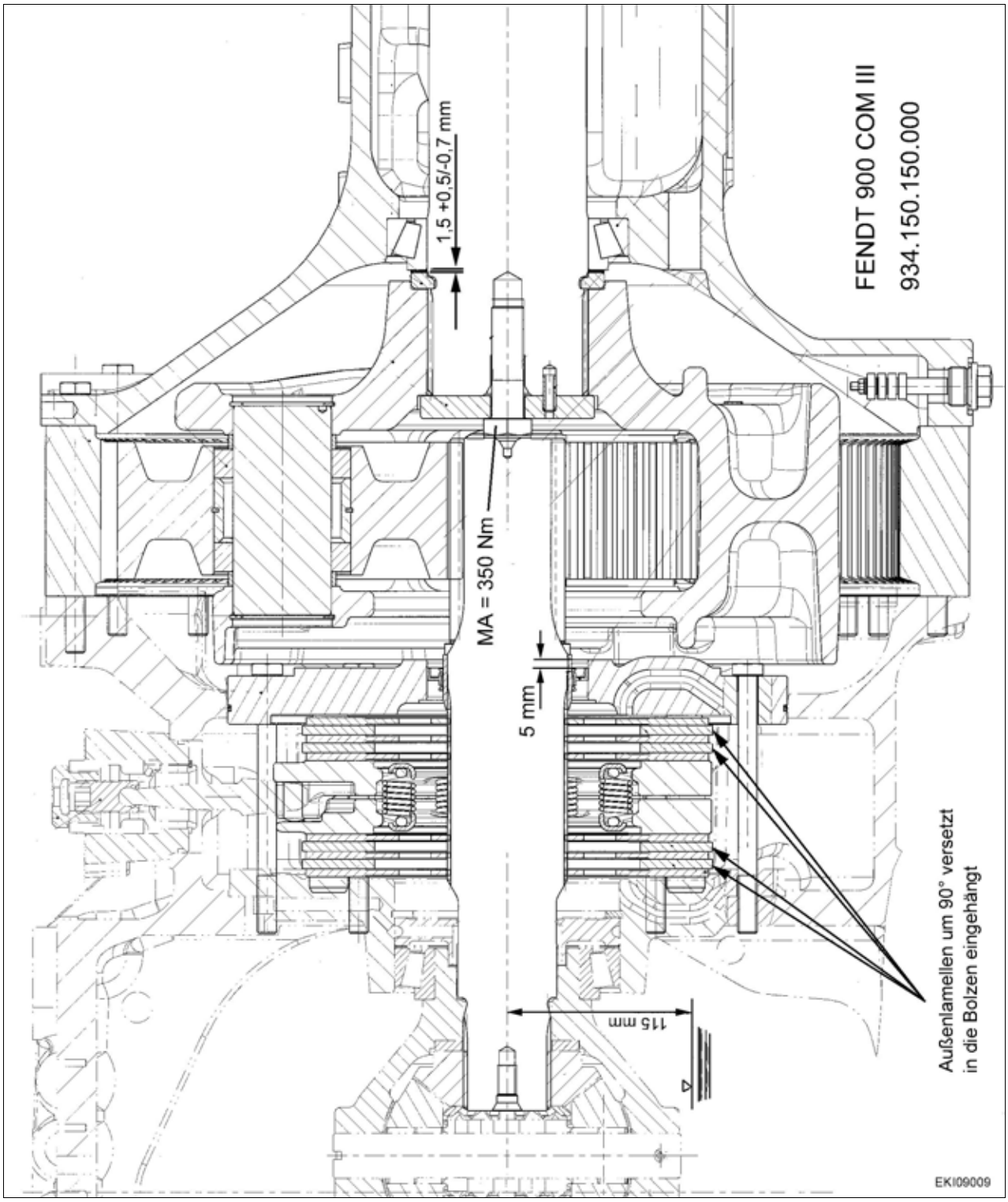


Fig. 1. I003573

Brake discs

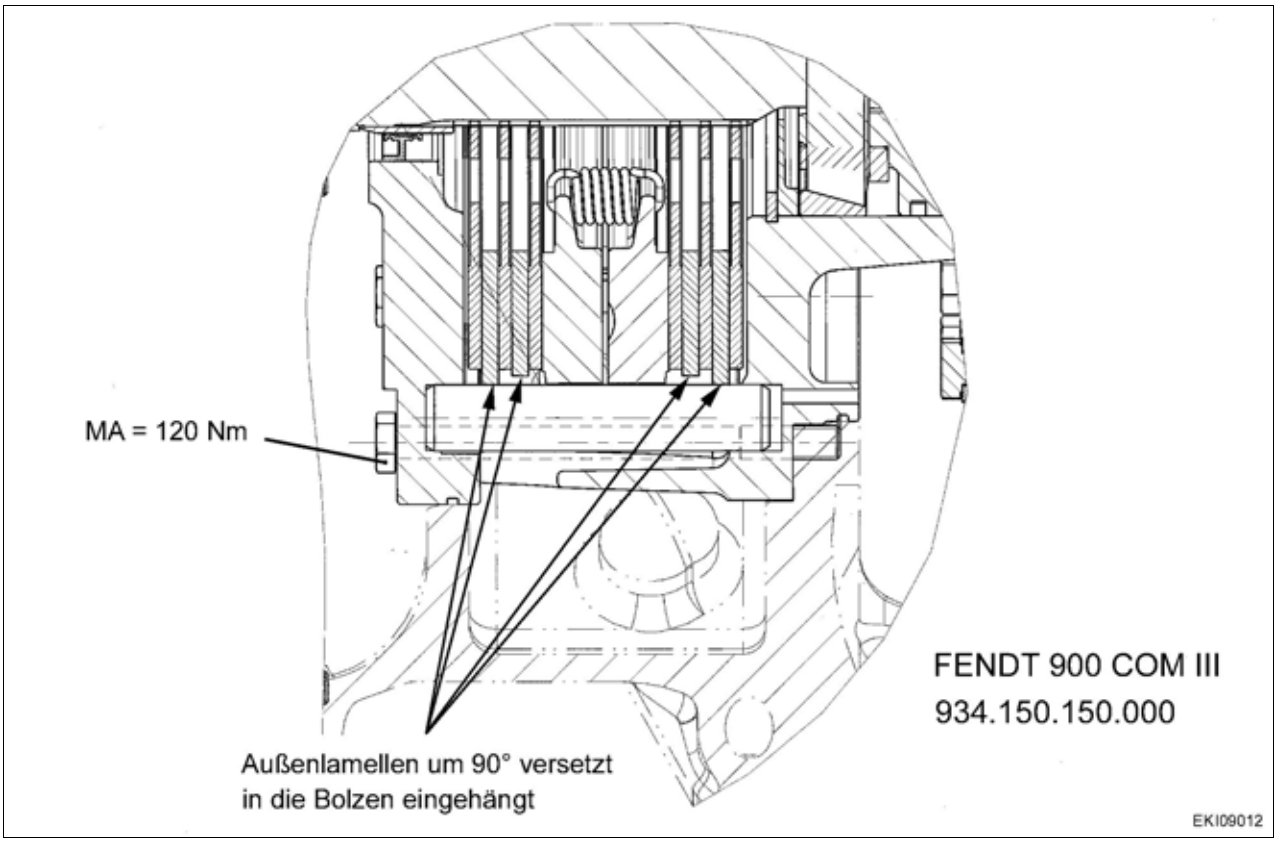


Fig. 2. I003574

Actuator plate

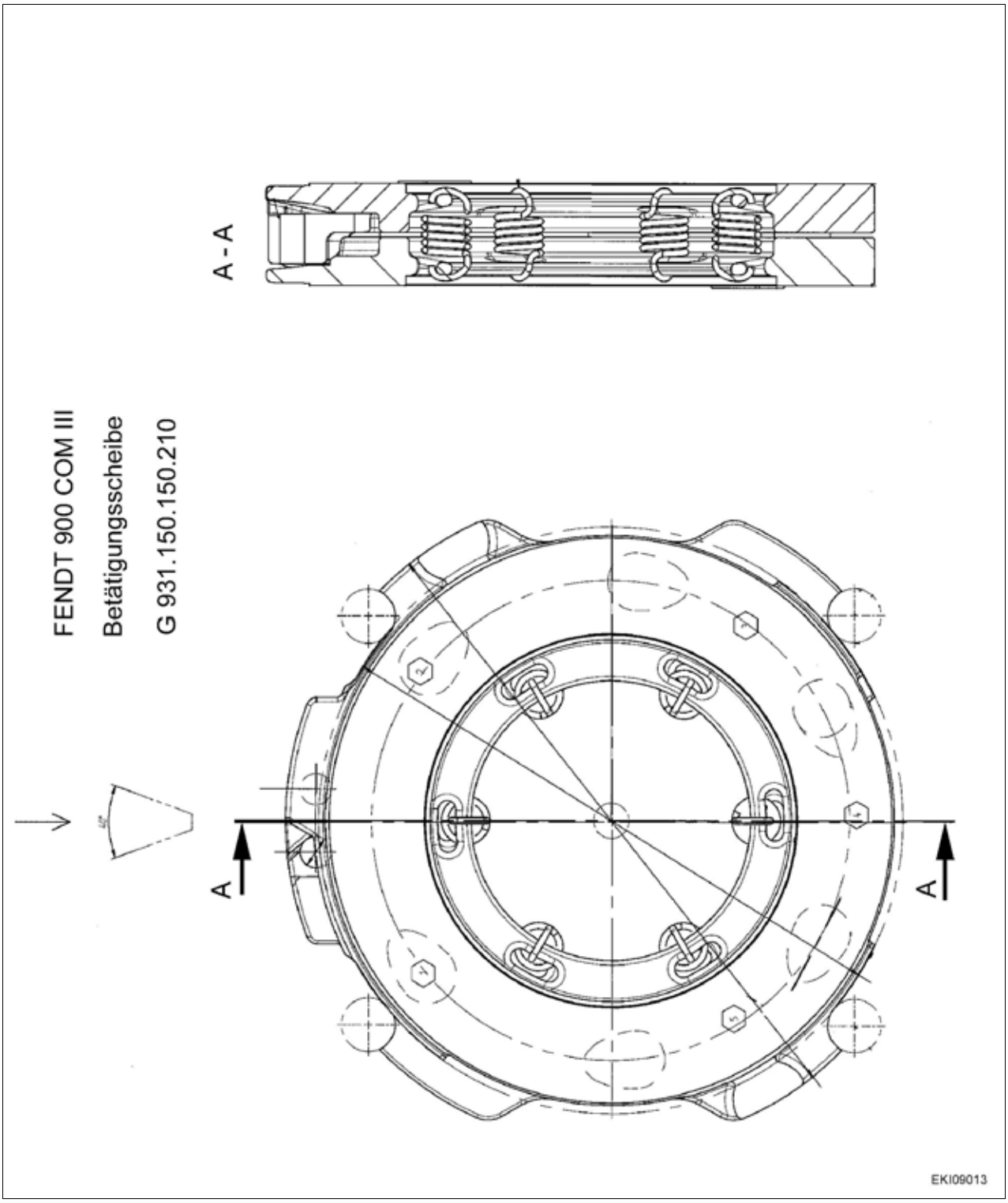


Fig. 3. I003575

Rear wheel brake adjustment information

NOTE: *Chapter 1070 Reg. F - Adjusting the rear wheel brake*
Chapter 1070 Reg. C - Technical drawing of the wheel brake cylinder

2 Technical drawing of actuator cylinder and wheel brake cylinder

Diagram: Actuator cylinder and wheel brake cylinder

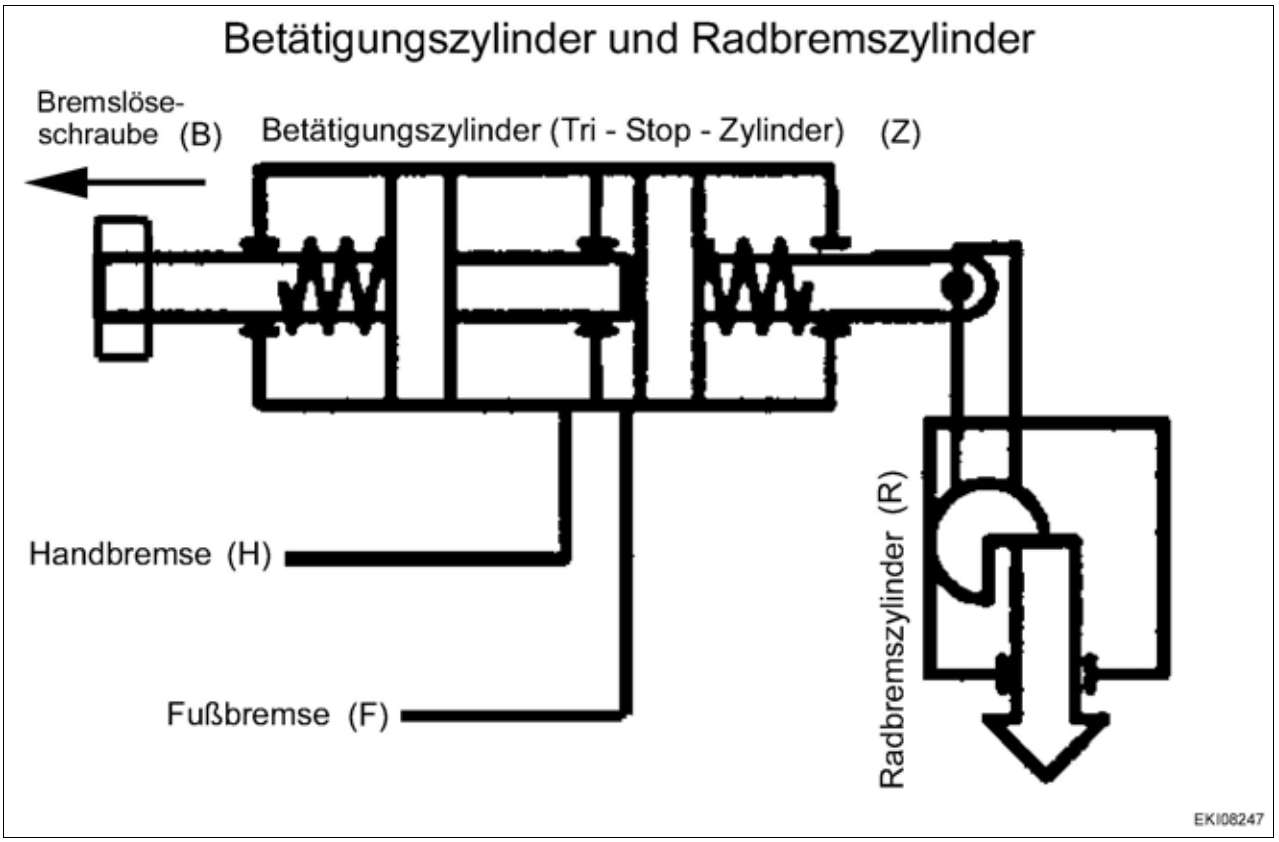


Fig. 4. I001911

Item	Designation	Item	Designation
B	Brake release screw	R	Wheel brake cylinder
F	Foot brake connection (**Note:** The foot brake is applied with compressed air)	Z	Actuation cylinder (tri-stop-cylinder)
H	Hand brake connection (**Note:** The hand brake is released with compressed air)		

Wheel brake cylinder (2-circuit brake)

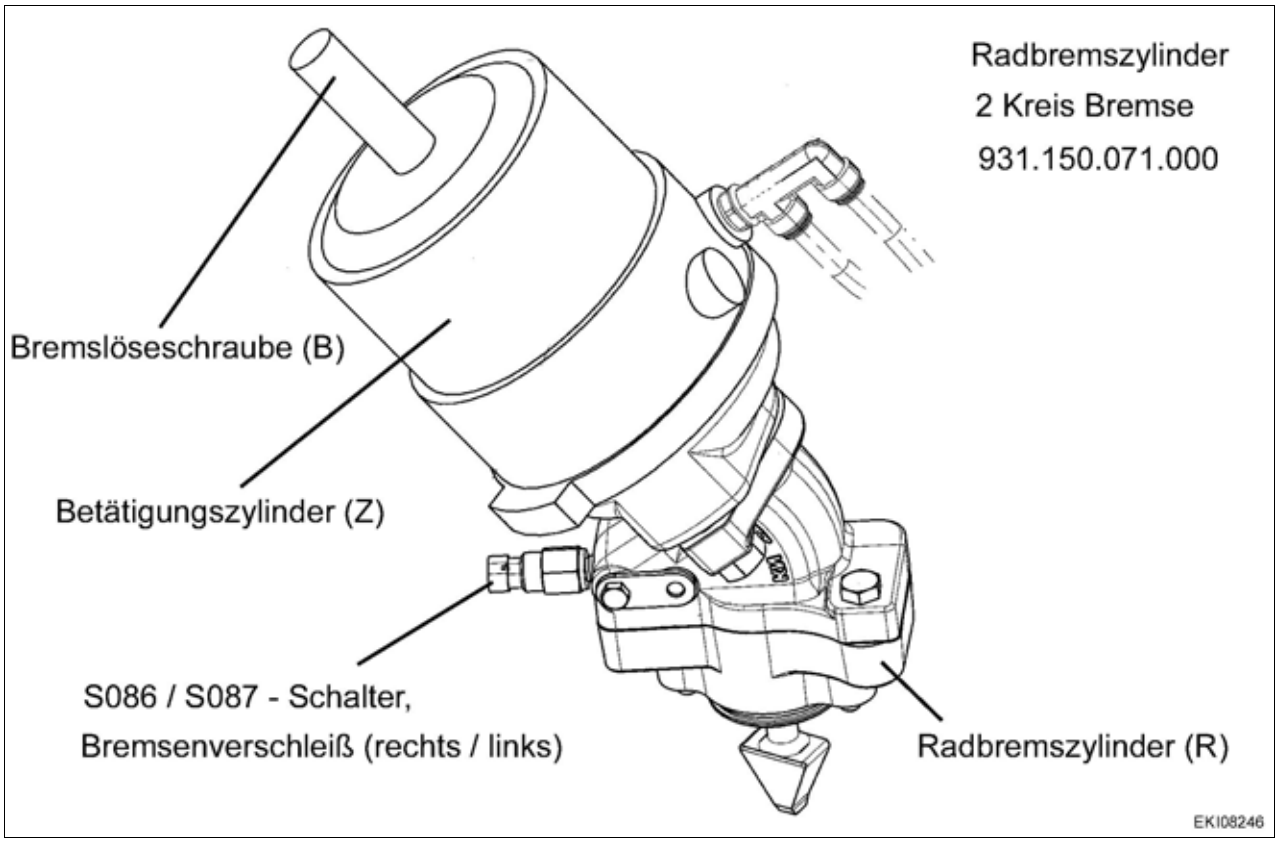


Fig. 5. I001912

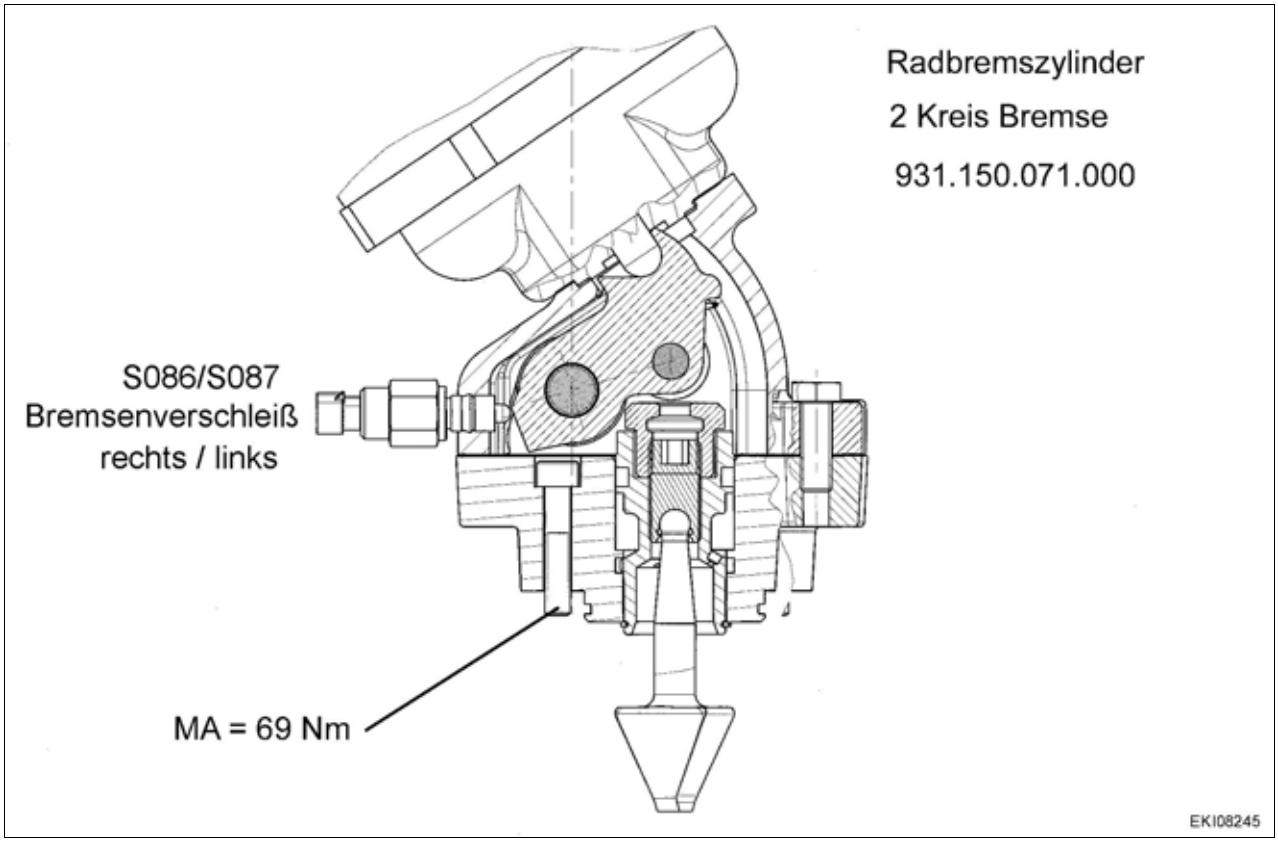


Fig. 6. I001913

Wheel brake cylinder (1-circuit brake)

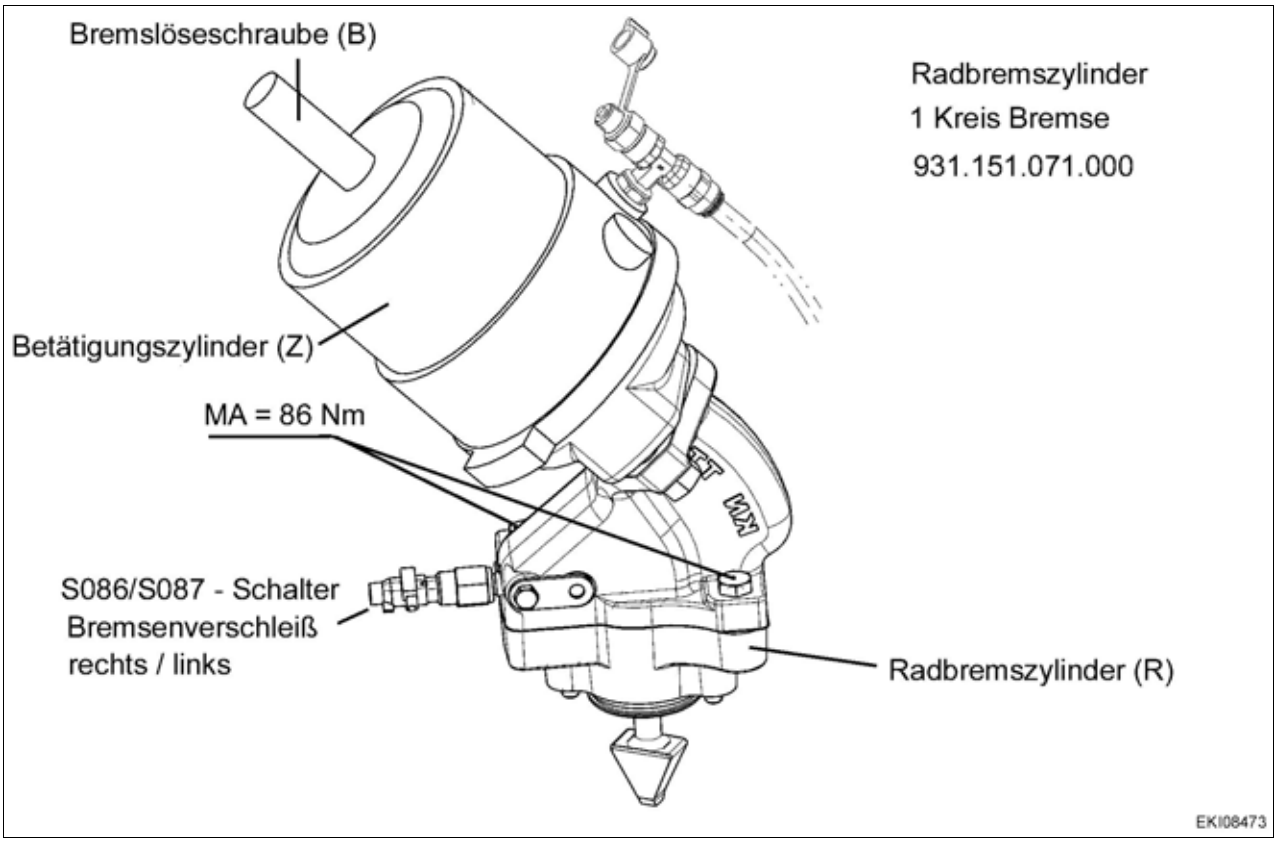


Fig. 7. I001918

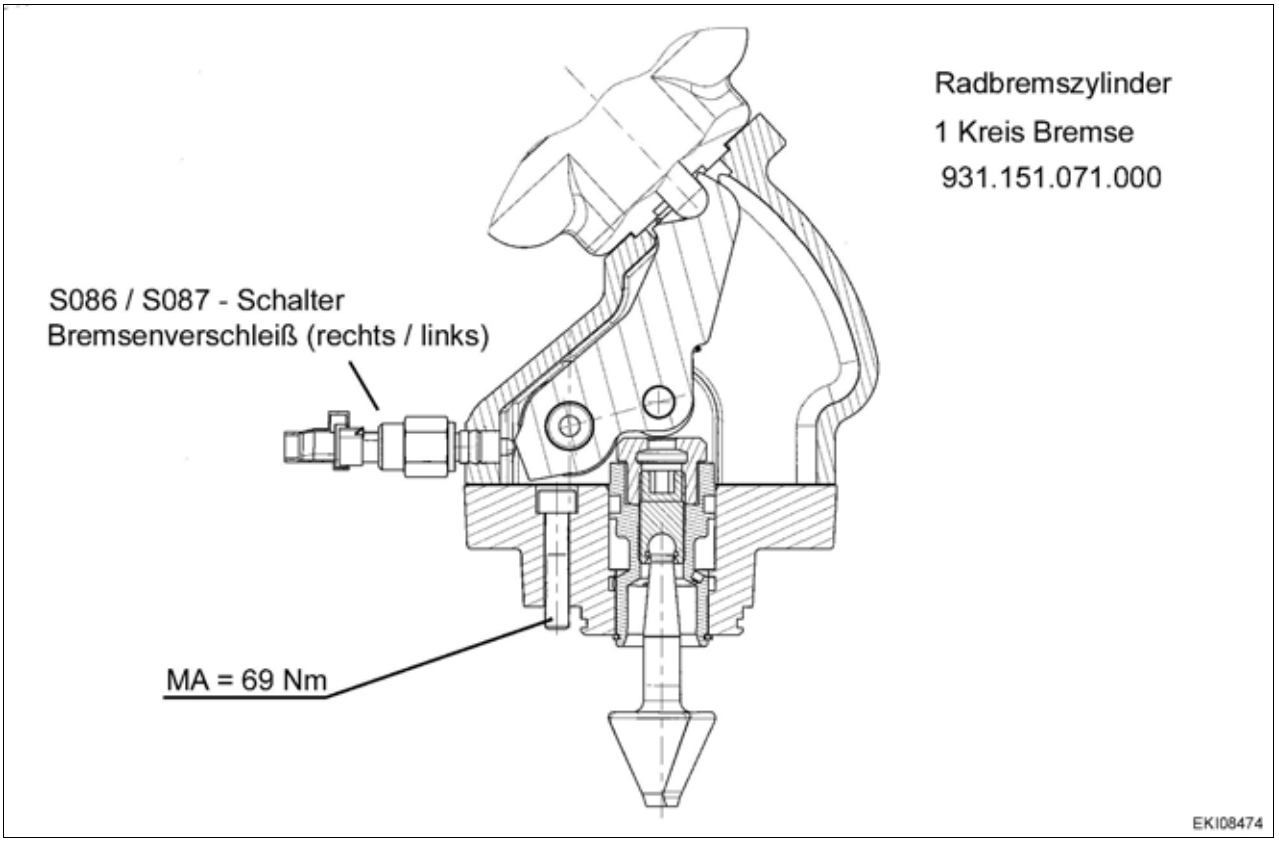


Fig. 8. I001919

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-

3 Technical drawing of the wheel brake cylinder

Wheel brake cylinder, 1-circuit brake (40, 50 km/h)
1-circuit = Rear wheel brake
+ 4WD engagement when braking

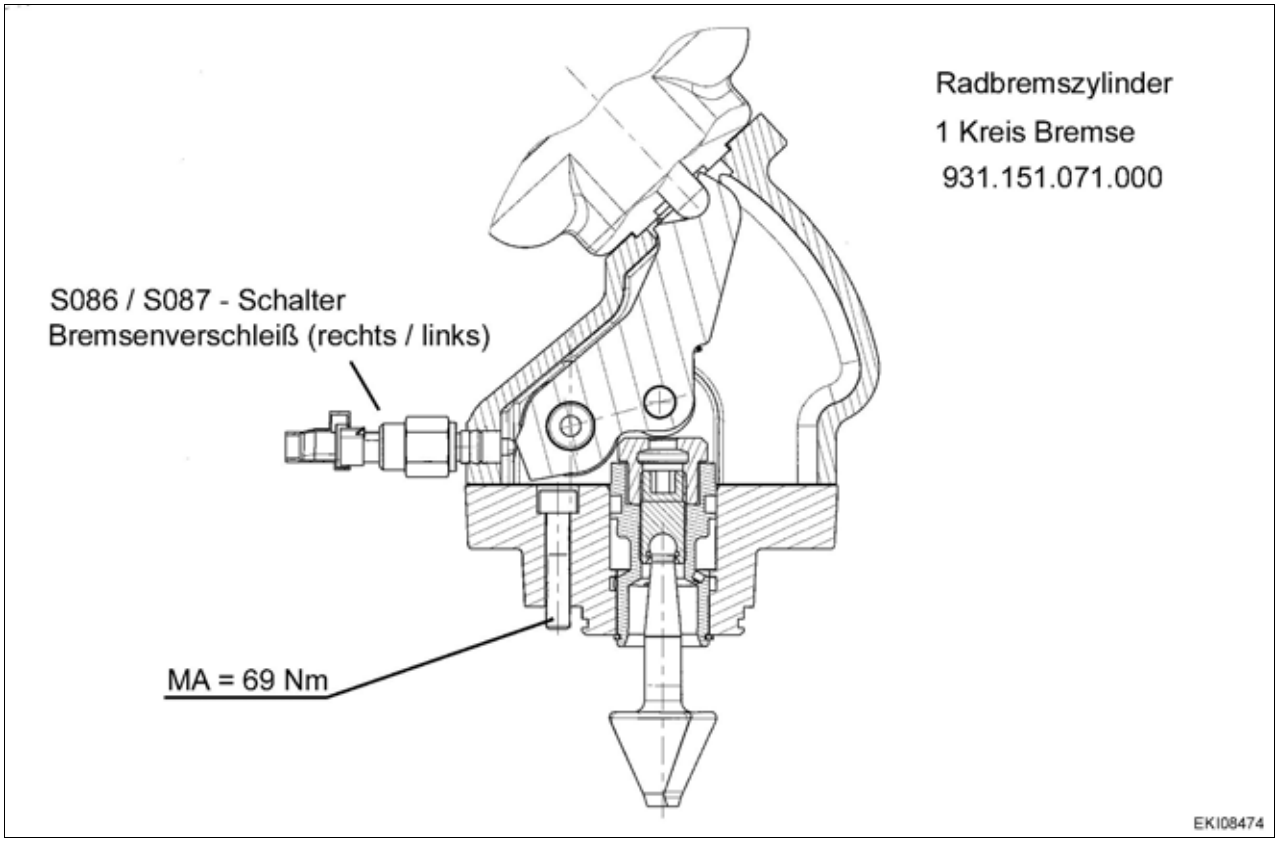


Fig. 9. I001919

Wheel brake cylinder, 2-circuit brake (40, 50, 60 km/h)
1-circuit = Rear wheel brake
2-circuit = Front wheel brake

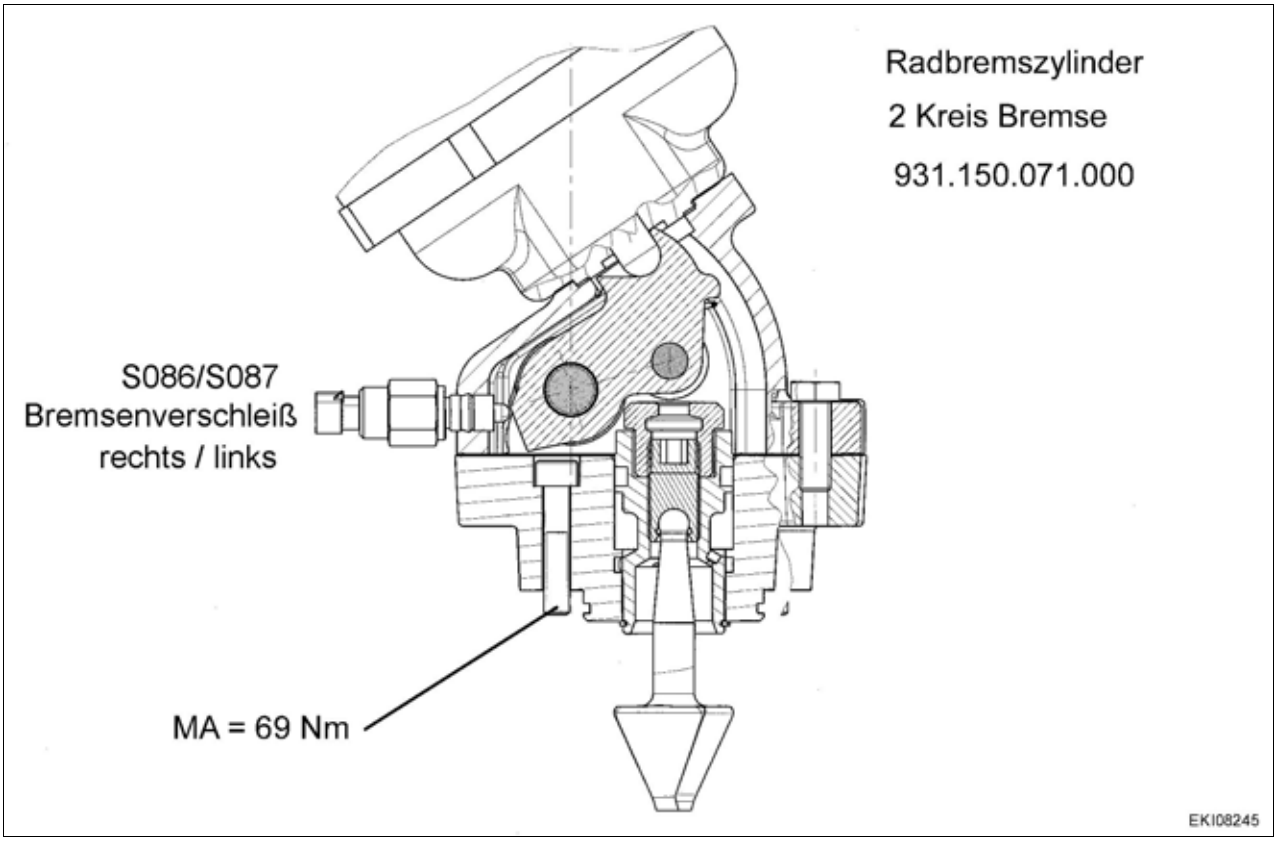


Fig. 10. I001913

Testing options and adjustment of the tractor brake

NOTE: *For brake actuation, please see:*
Chapter 8800 Reg. C – 1-circuit brake diagram (compressed air system)
Chapter 8800 Reg. C – 2-circuit brake diagram (compressed air system)

NOTE: *For checking tractor brake (compressed air system), please see:*
Chapter 8800 Reg. E - Checking compressed air system (area: front wheel brake, rear wheel brake, hand brake)

NOTE: *Adjusting the wheel brake cylinder:see §1*

NOTE: *Monitoring brake wear:see §113*

NOTE: *Adjustment of S086/S087:see §3*

F Setting and calibrating

1 Adjusting rear wheel brake. 17
2 Magnet setting for S005/S006 switch, right/left brake 21
3 S086/S087 switch, adjust brake wear 23

1 Adjusting rear wheel brake

Preliminary work:

– Position the tractor on a level surface and ensure it cannot move
– Apply the hand brake
– Remove the rear wheel

Unscrew the hand brake release screw on the Tristop cylinder by turning counterclockwise until it becomes noticeably more difficult to turn, then tighten as far as it will go with a spanner (SW24)

Fig. 1. I002468

Unplug the air hoses and sensors

Fig. 2. I002469

To release the air hoses, push the plastic ring back and withdraw the hose

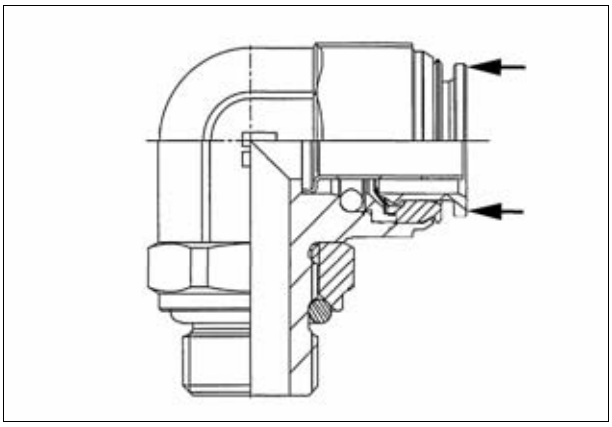


Fig. 3. I001760

Loosen the fixing bolts on the upper part of the cylinder

Fig. 4. I002470

Remove the Tristop cylinder and the cylinder upper part

Fig. 5. I002477

Loosen the locknut (SW 36) on the lower part of the cylinder, holding the guide piston (SW41) against it.

Fig. 6. I002471

Screw in the adjustment screw and tighten it to a torque of 30 Nm (setting the brake)

Fig. 7. I002473

Loosen the adjustment screw (approx. 1 turn)

Fig. 8. I002472

Tighten the adjustment screw to a torque of 7 Nm (or block rear wheel)

Fig. 9. I002474

Unscrew the adjustment screw 6.5 turns

Fig. 10. I002472

Fix the adjustment screw and tighten the locknut

Fig. 11. I002475

Tighten the locknut and guide piston to a torque of 80 Nm + 20 Nm

Fig. 12. I002476

Fit the cylinder upper part and Tristop cylinder and tighten the fixing bolts
Tightening torque: 86 Nm

Fig. 13. I002470

Attach the hoses and cables

Fig. 14. I002469

Screw in the hand brake release screw on the Tristop cylinder in a clockwise direction

Fig. 15. I002468

2 Magnet setting for S005/S006 switch, right/left brake

Setting the S005/S006 switch magnets

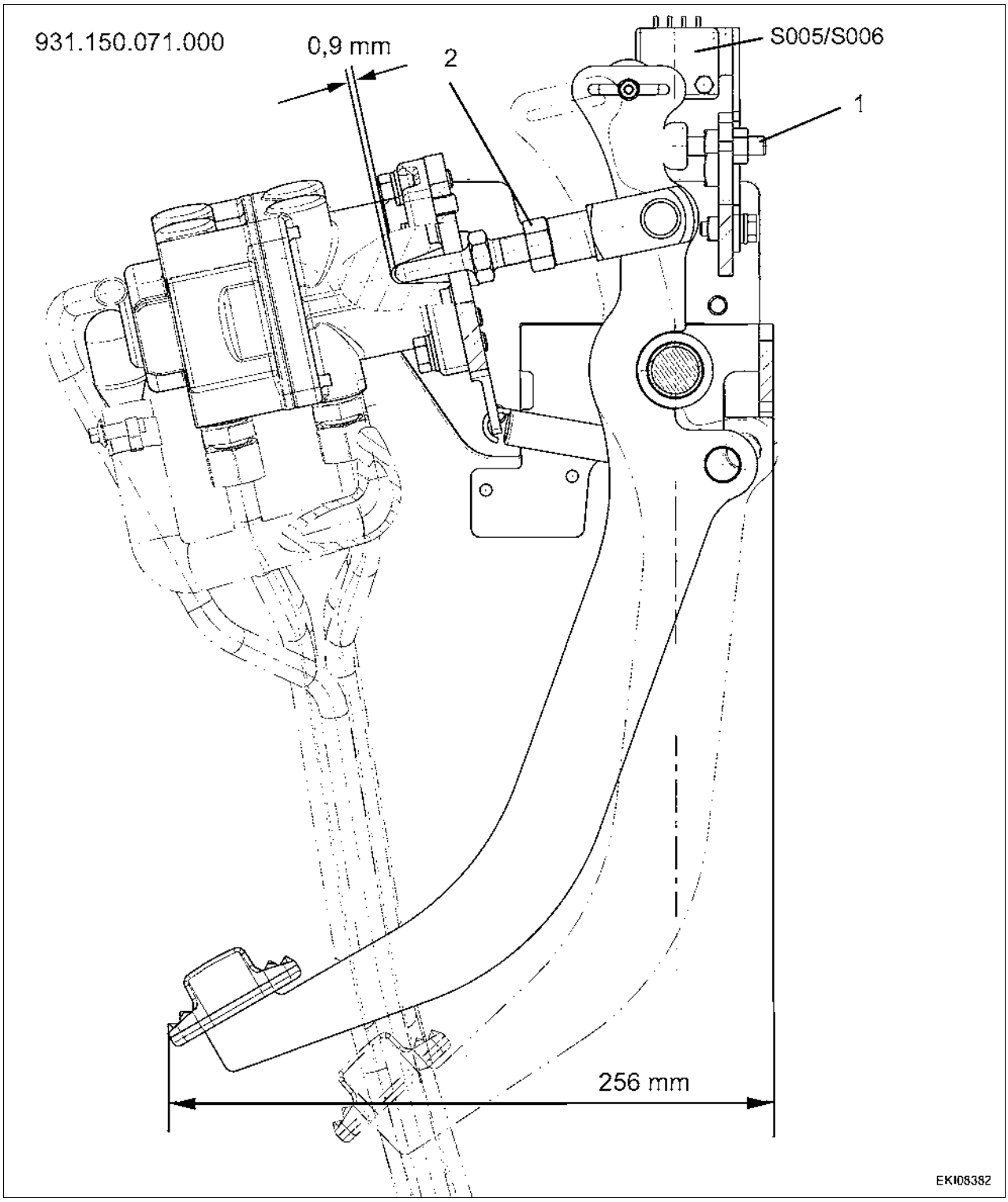


Fig. 16. I001649

Setting instructions for brake pedal
Set the adjustment screw (1) to **256 mm.**

Adjust piston rod play 0.9 mm (1/2 turn on the push rod (2) equals approx. 5 mm pedal travel).

Setting instructions for magnet (4)

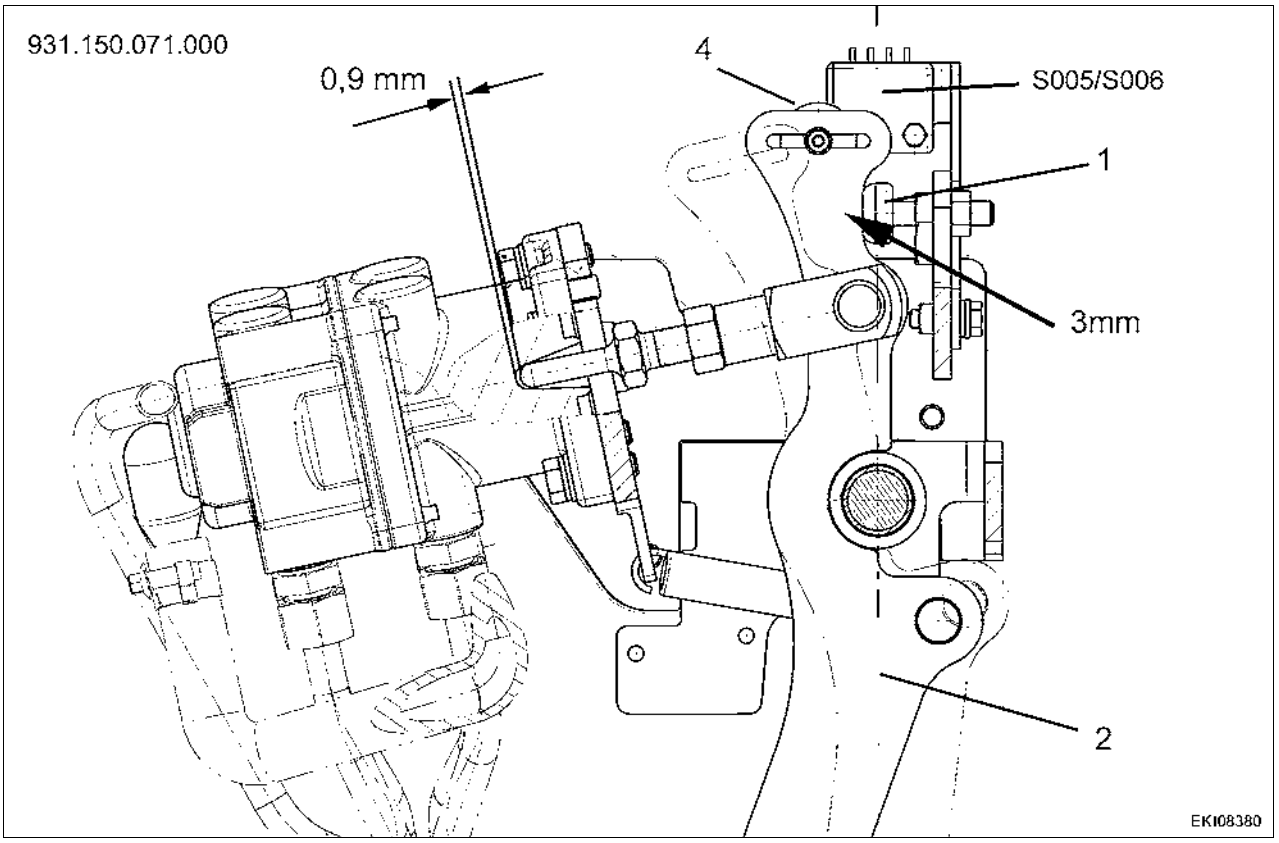


Fig. 17. I001650

If necessary: unlock brake pedals, **set individually.**

Place shims between buffer (1) and brake pedal (2) to provide a space of 3 mm.
This corresponds to a pedal travel of approx. 11 mm.

Connect X899.980.246.206 adapter cable only to **S005** - Switch, right brake.

Connect multimeter (ohmmeter) to pin 3 and pin 4.

Push magnet (4) towards **S005** - Switch, right brake until the ohmmeter displays a resistance of approx. 121 ohms (switch closed)

Screw magnet (4) tight.

Remove shims (3 mm) from between the buffer (1) and the brake pedal (2).

NOTE: *The setting for **S006** - Switch, left brake is carried out in the same way*

Checking setting of magnet for S005/S006 switch
Measure pin 3 and 4 with multimeter (ohmmeter).

Unlock brake pedals.

Brake pedal in rest position (solenoid switch closed).
(resistance approx. 121 ohms)

Slowly operate single wheel brake (the solenoid switch must open).
After the brake pedal has travelled approx. 28 mm, the S005 - Switch, right brake opens (resistance approx. 510 ohms).

When the brake pedal returns to its rest position, the **S005** - Switch, right brake must close no later than 5 mm before the pedal reaches its rest position (resistance approx. 121 ohms)

NOTE: *The check for the **S006** - Switch, left brake is carried out in the same way*

3 S086/S087 switch, adjust brake wear

NOTE:

– *Release handbrake, ensuring that there is sufficient pressure in the tank*

– *Foot brake **not** applied*

DANGER: Secure the vehicle to prevent it from rolling away!

Disconnect plug from the switch and connect adapter cable X899.980.246.204

Fig. 18. I007221

Connect multimeter to the adapter cable

Fig. 19. I007220

Turn switch until multimeter switches to 510 Ohm

Fig. 20. I007226

Mark switch relative to the housing

Fig. 21. I007223

Turn switch back 1 4/6 turns

NOTE: *When the switch is turned back, the multimeter will switch back to 120 Ohm*

Fig. 22. I007224

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

1080

Transmission/drive train

1080 Transmission/drive train

A General. 5

G Repair. 9

A General

1 2V3/2V4 high-pressure limiting valve 7
2 2V5 purge valve (function) 8

1 2V3/2V4 high-pressure limiting valve

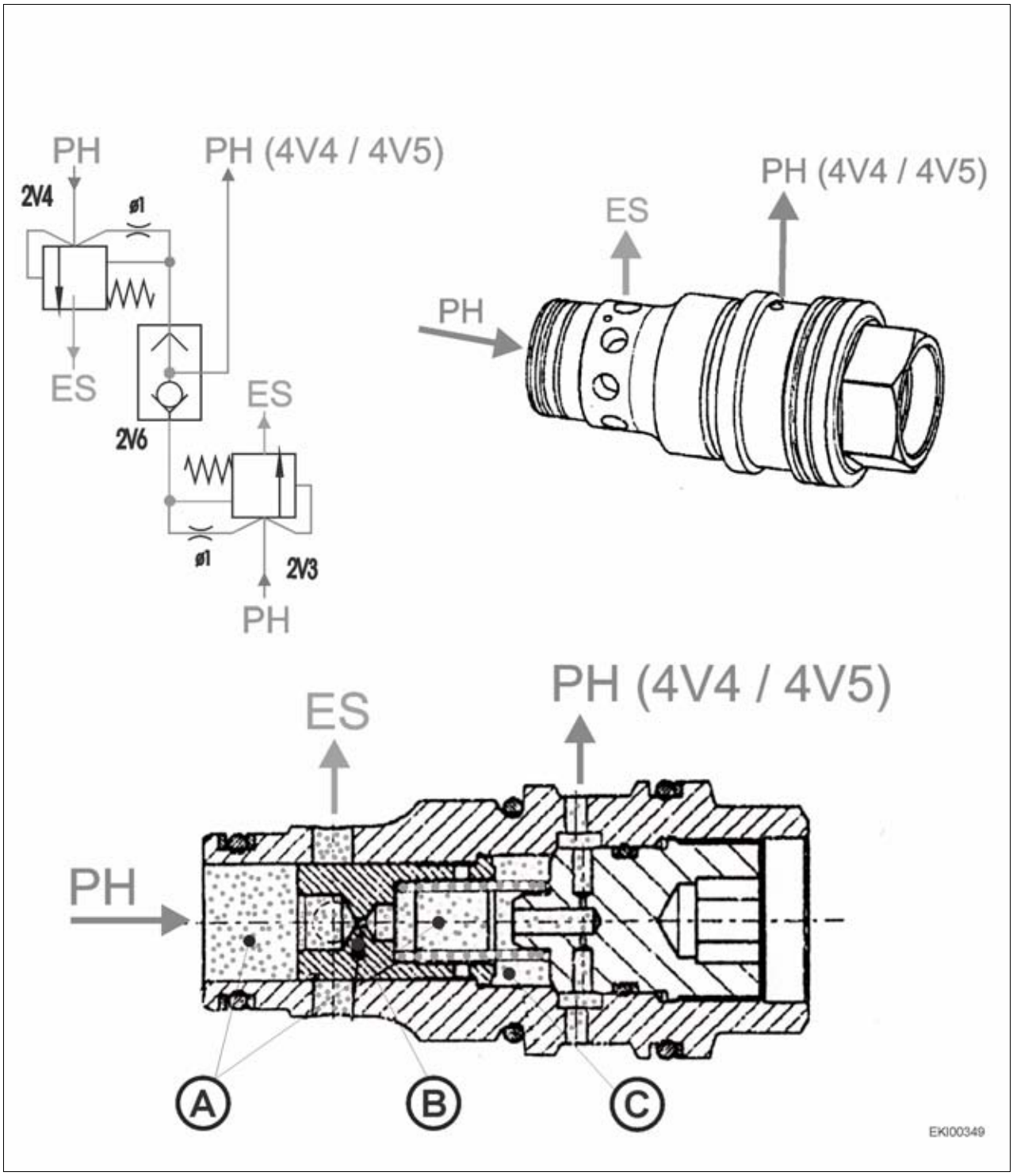


Fig. 1. I002165

A If the clutch and turbo-clutch valve is closed, the pressure is equal in both chambers. The spring holds the piston closed.

B If the clutch or turbo-clutch valve is open, the pressure drop through the diaphragm (x piston surface area) becomes greater than the spring force. The piston moves to the right and connects PH with ES.

C The pressure is limited by the clutch and turbo-clutch valves.

2 2V5 purge valve (function)

Pressure at **A, B** max. 550 bar

Pressure at **T** max. 50 bar

Opening pressure: delta p = 7 bar between **A** and **B**

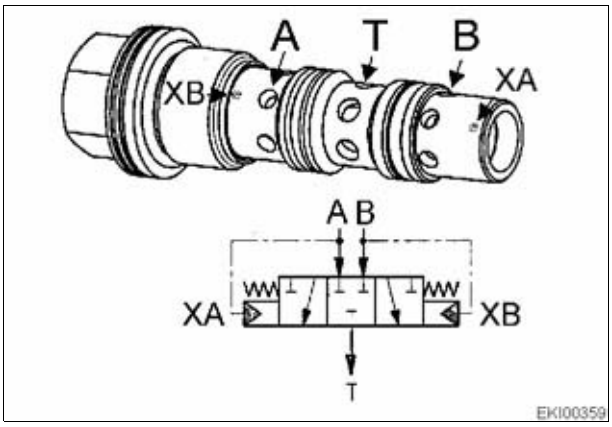


Fig. 2. I002166

Transmission in "neutral"

pA = pB, delta p < 7 bar

Piston is held in mid-position by spring force. Both channels (**A, B**) are closed.

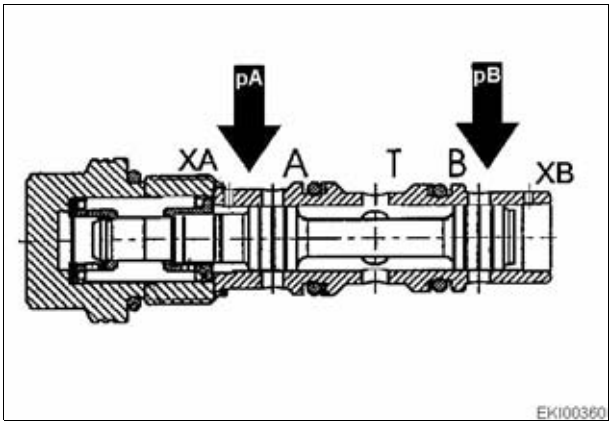


Fig. 3. I002167

"Tractive mode"

pA > pB, delta p > 7 bar

Piston is pushed to the right via control bore **XA**.

Channel **B** is connected to **T**. Hot oil can flow from the low pressure side **B** via **T** to the discharge connection and to the oil cooler.

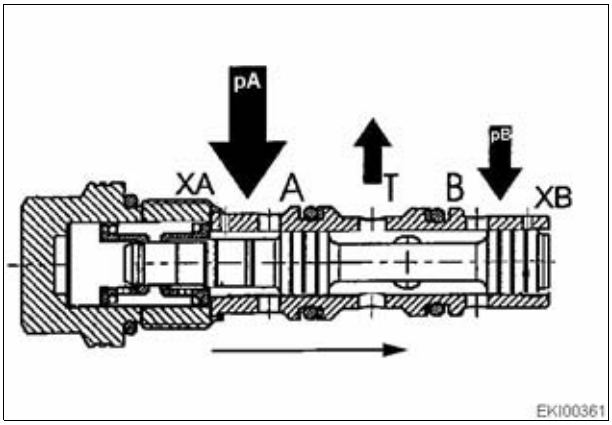


Fig. 4. I002168

"Pushing mode"

pA < pB, delta p > 7 bar

Piston is pushed to the left via control drilling **XB**.

Channel **A** is connected to **T**. Hot oil can flow from the low pressure side **A** via **T** to the discharge connection and to the oil cooler.

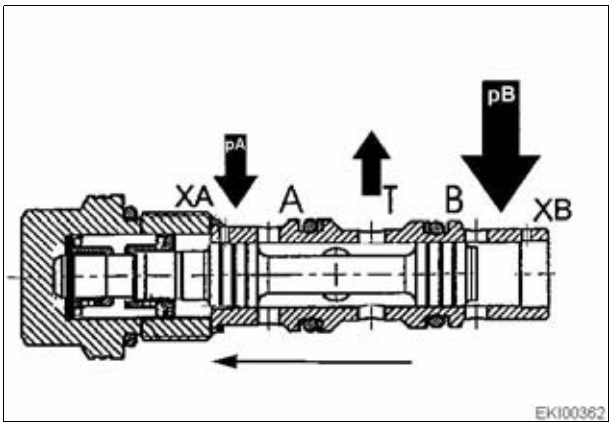


Fig. 5. I002169

G Repair

1 Dismantling the continuous drive train 11
2 Fit the continuous drive train 20
3 Installing A009 actuator unit 30
4 Replacing high-pressure limiting valve 34
5 Replacing the purge valve 35
6 Top up the transmission oil 36

1 Dismantling the continuous drive train

Preliminary work:

– Remove rear wheels
– Remove cover panels
– *see §1*

Drain transmission oil.

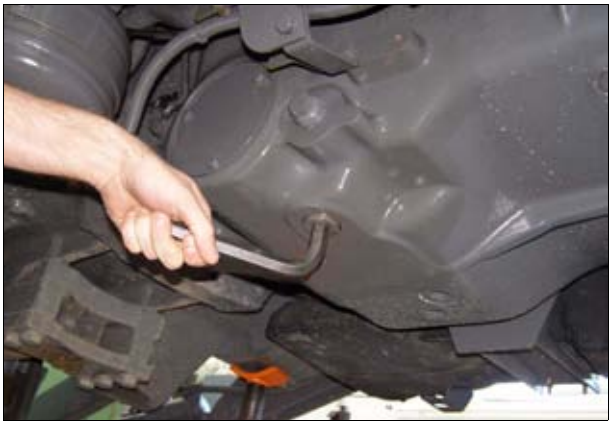


Fig. 1. I001718

Loosen compressed air bracket

Fig. 2. I001811

Remove the left hand fuel tank retaining strap

Fig. 3. I001812

Unscrew the retaining strap bracket

Fig. 4. I001813

Push the bracket to the side and remove

Fig. 5. I001815

Remove the housing cover screws

Fig. 6. I001814

Carefully take the weight of the housing cover and raise it

DANGER: Do not walk or stand under suspended loads!

Fig. 7. I001816

Remove the actuator unit

Fig. 8. I001818

Remove the plug on the transmission valve block solenoid valves

Fig. 9. I001819

Remove the hydraulic piping between the valve block and the valve housing

Fig. 10. I001820

Loosen the coolant piping on the valve housing

Fig. 11. I001822

Loosen the pipe clamps

Fig. 12. I001824

Loosen the hydraulic piping to the hydraulic oil cooler on the engine and remove the piping

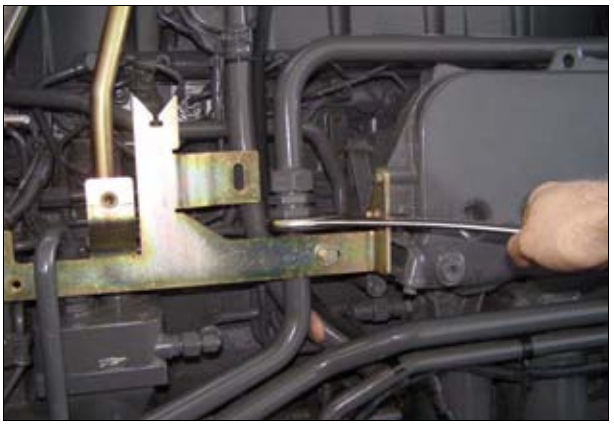


Fig. 13. I001825

Remove the valve block

Fig. 14. I001823

Unscrew the emergency actuation unit

Fig. 15. I001826

Loosen the transmission valve block retaining screws

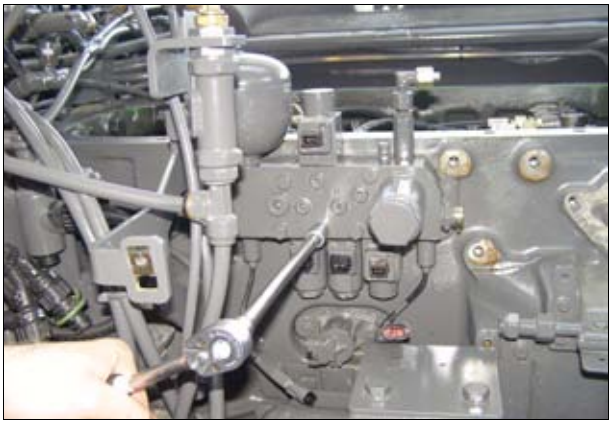


Fig. 16. I001827

Remove the transmission valve block

Fig. 17. I001828

Unclip the securing rings and press the hydraulic piping inwards
Separate the steel piping

Fig. 18. I001829

Unclip all circlips and press hose piping inwards.

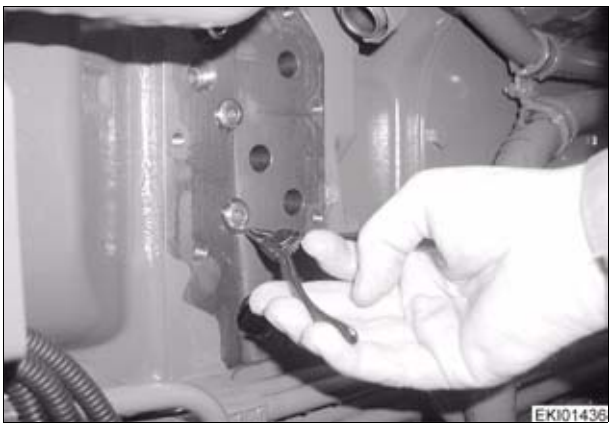


Fig. 19. I002827

Dismantle sensor, collecting shaft

Fig. 20. I001830

Dismantle sensor, bevel pinion

Fig. 21. I001831

Unscrew the stud bolt and withdraw the actuator shaft

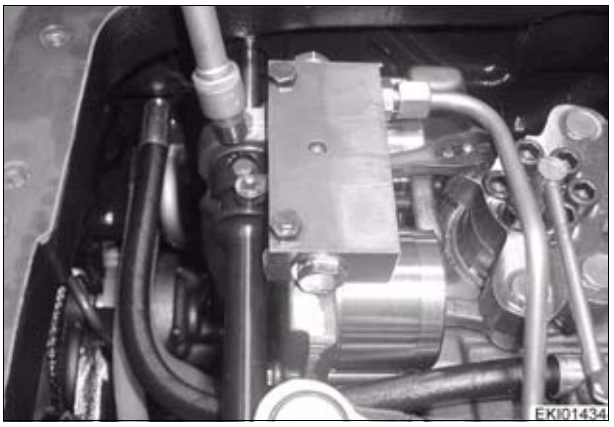


Fig. 22. I002826

Remove the hydraulic hose (enhanced switching pressure supply)

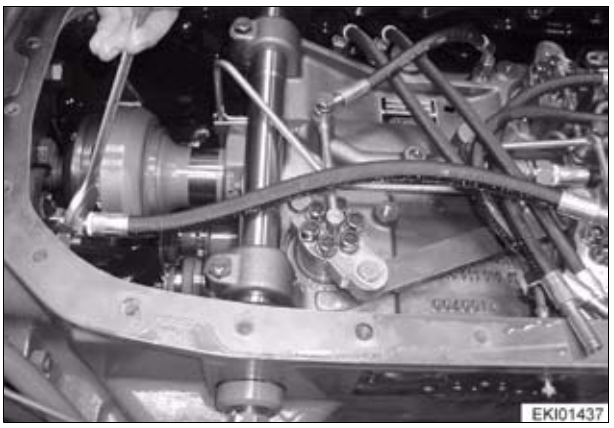


Fig. 23. I002828

Unclip the drive shaft securing ring and push it to the rear

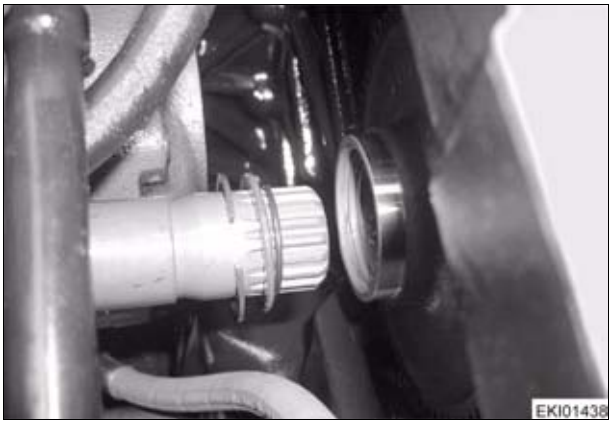


Fig. 24. I002829

Remove three M8 hex. screws from the planetary gear and push the drive shaft to the rear

Fig. 25. I002830

Unclip the securing ring on the pinion shaft
Push the securing ring, washer and sleeve onto the bevel pinion in the direction of the arrow

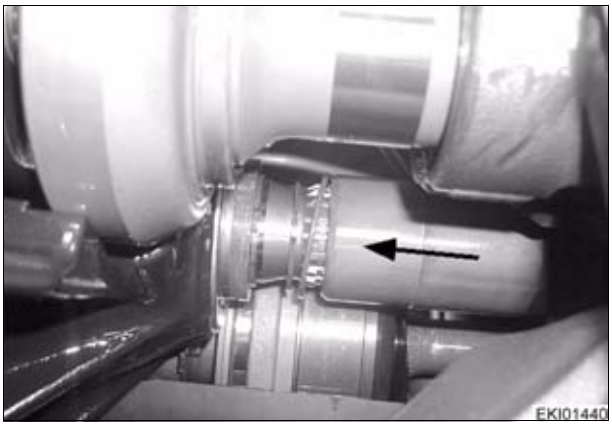


Fig. 26. I002831

Using the fitting lever swing the hydraulic motors inwards

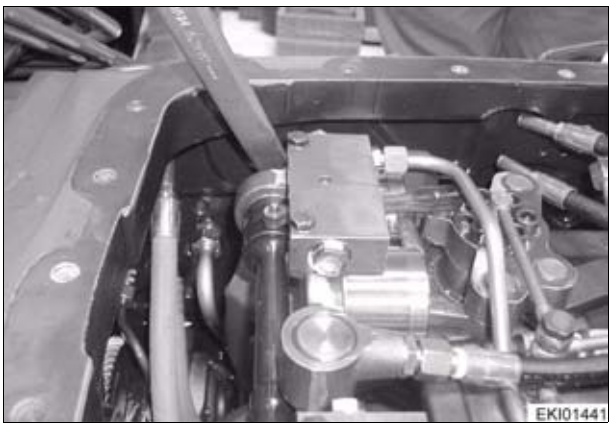


Fig. 27. I002833

Remove the hex. nuts from the bearings

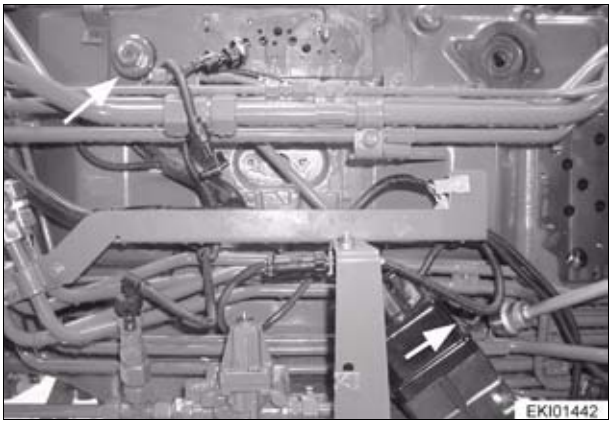


Fig. 28. I002834

Loosen the upper locking screws M12
Remove the two screw plugs on the under side of the transmission housing
Collect any escaping oil.
Loosen the two locking screws M12 as above

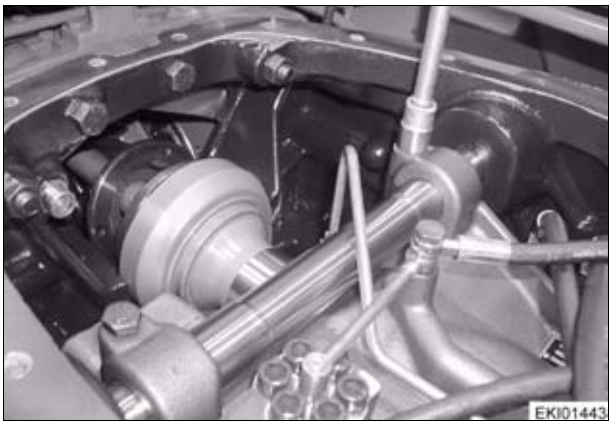


Fig. 29. I002835

Fit the hoisting gear
Insert the lifting hooks and slightly tension

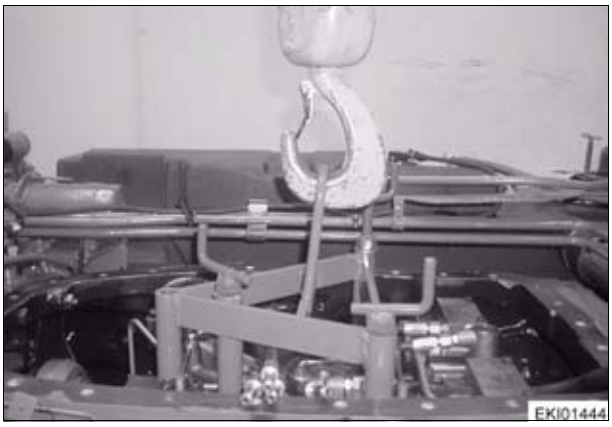


Fig. 30. I002836

Screw on the slide hammer puller with adapted M20 nut (self made)
Remove shafts for elastic pivot
Remove upper shaft first

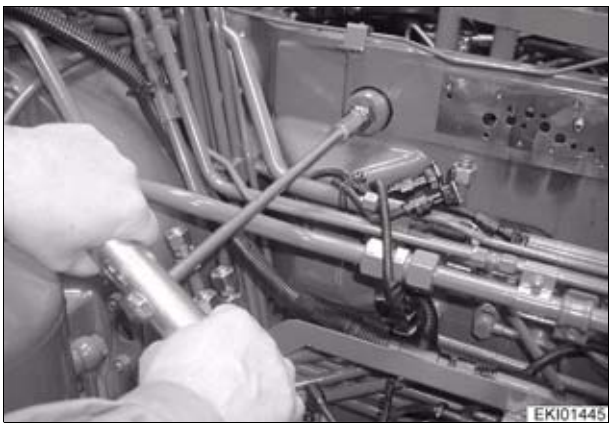


Fig. 31. I002837

Raise transmission unit carefully out of transmission housing using hoist
Ensure clearance of all components!

DANGER: Do not walk or stand under suspended loads!

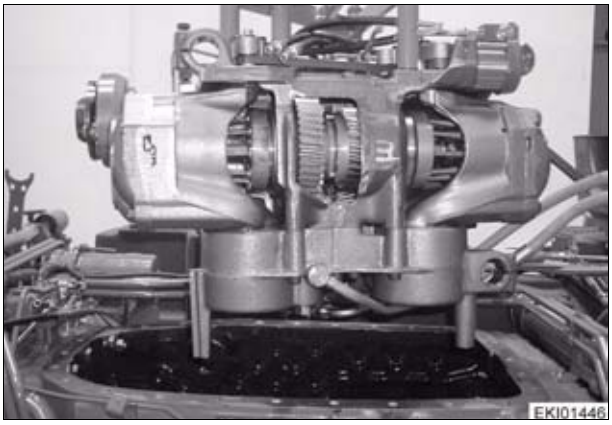


Fig. 32. I002838

2 Fit the continuous drive train

Attach transmission unit to hoist, taking appropriate safety precautions.
Set travel range control I-II (arrowed) to neutral (middle)

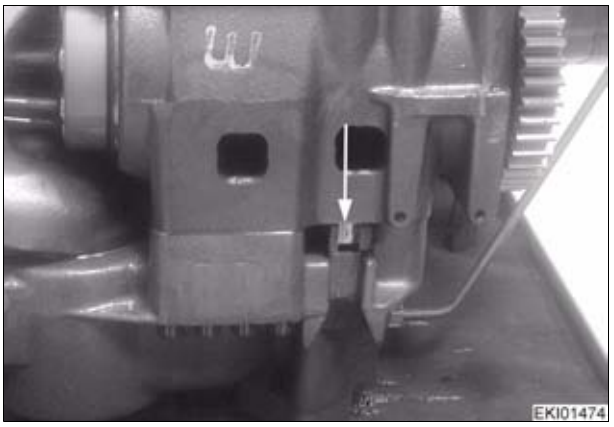


Fig. 33. I002893

Clean sealing surfaces on transmission housing to remove oil and seal residue.
Set the change lever (arrowed) of the travel range control I-II in the transmission housing to neutral (middle)

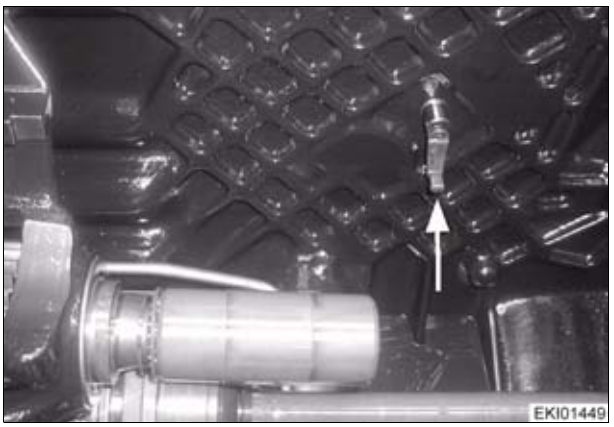


Fig. 34. I002877

Where removed:
Fit the circlip and washer to the pinion shaft splines, push the sleeve onto the pinion shaft as far as it will go
Locate the flange on the connection shaft and fit connection shaft.

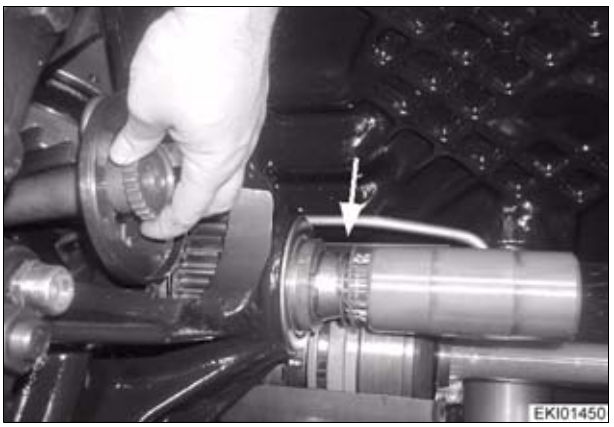


Fig. 35. I002878

Insert the ML drive into the transmission housing. Ensure clearance for all components.
Fit both shafts into the transmission housing bores and fit the transmission unit

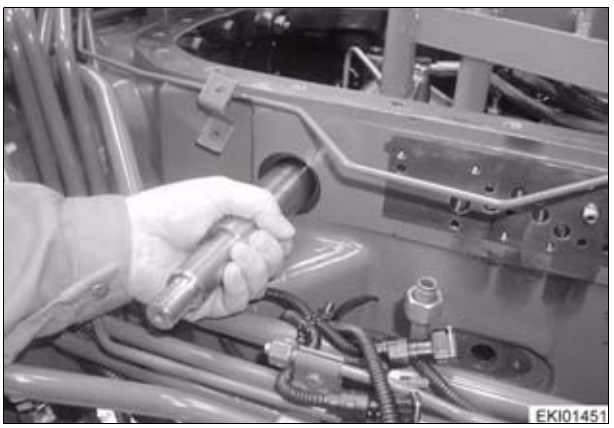


Fig. 36. I002879

Check the bushes for wear and, if necessary, use new bushes
Insert four bushes into bores as far as they will go

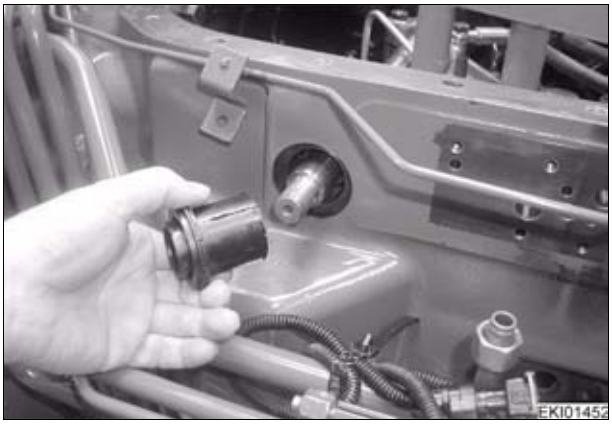


Fig. 37. I002880

Fit the rings to the left and right as appropriate to the shaft, with the cut-out towards the bushing
Screw on the M20 nuts

Fig. 38. I002881

Tighten the four M20 nuts
Torque: 250 Nm

NOTE: *When tightening each of the nuts, hold the second nut on the shaft against it*

Remove the hoist

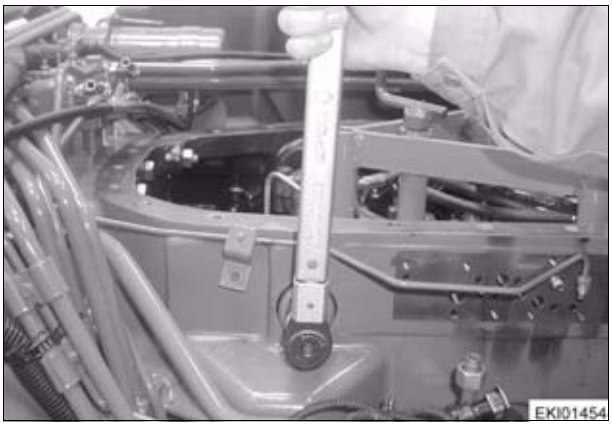


Fig. 39. I002882

Turn one of the planet wheels of the power distribution planetary gear upwards

Using a feeler gauge, centralise the transmission unit (same play to left and right)

Fig. 40. I002883

Tighten all four securing screws (two above, two beneath)
Torque: 86 Nm
Using new seals, fit both screw plugs to the underside of the transmission housing
Switch through travel range control I-II

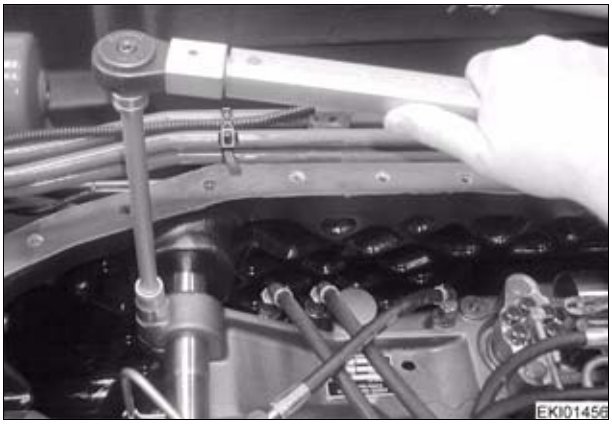


Fig. 41. I002884

Turn ML transmission until one tooth of the gear plate is in line with the bore for the Hall sensor

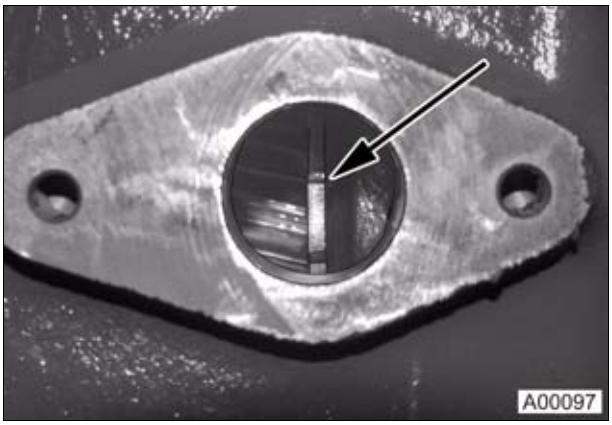


Fig. 42. I002894

Coat sealing surface of Hall sensor with X 903.050.553.000 sealant and insert into the transmission housing bore.
Tighten screws, torque: 25 Nm

Fig. 43. I002895

Swing out the hydraulic motor as far as possible

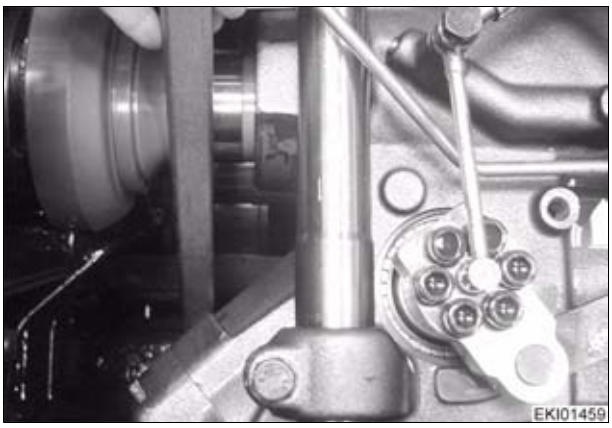


Fig. 44. I002885

Slide the sleeve on the pinion shaft forwards until the groove for the circlip is uncovered
Clip circlip into groove

NOTE: *If the sleeve is not aligned, jack up one of the front wheels and turn it*

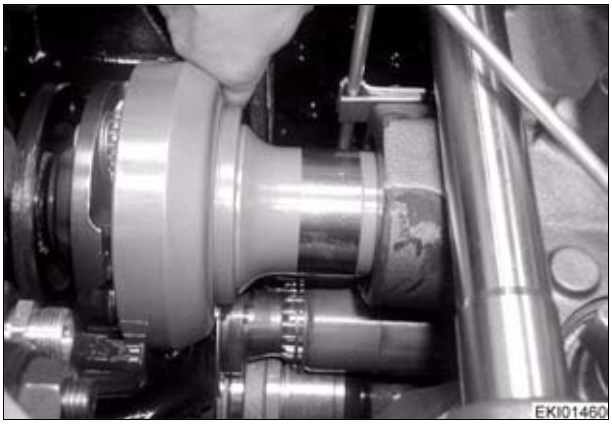


Fig. 45. I002886

Mount flange on planetary gear of the power distribution system
Tighten the M8 hex. bolts
Torque: 25 Nm

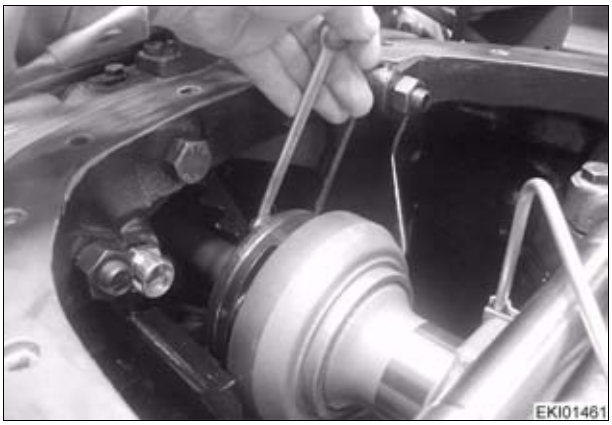


Fig. 46. I002887

1 Short blue hose (discharge)
2 Long blue hose (feed)
3 Black hose (lubrication)

Insert the hydraulic hoses into the transmission housing bores and fit the circlips (opening downwards)

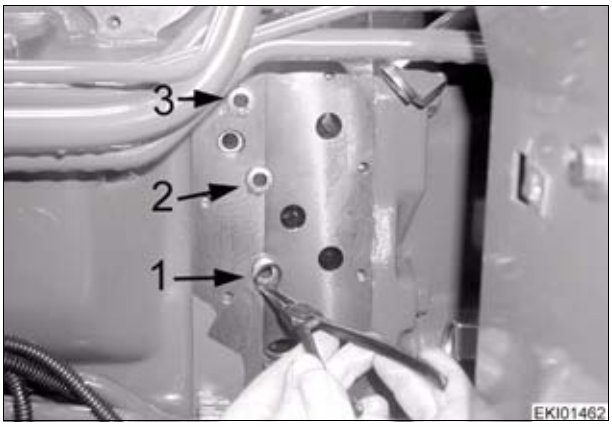


Fig. 47. I002888

Place the snap ring into the groove in the shaft, push the shaft forwards and fit the washer
Fit the circlip into the groove in the spur gear

Fig. 48. I002889

Fit the hydraulic hose (enhanced switching pressure supply)

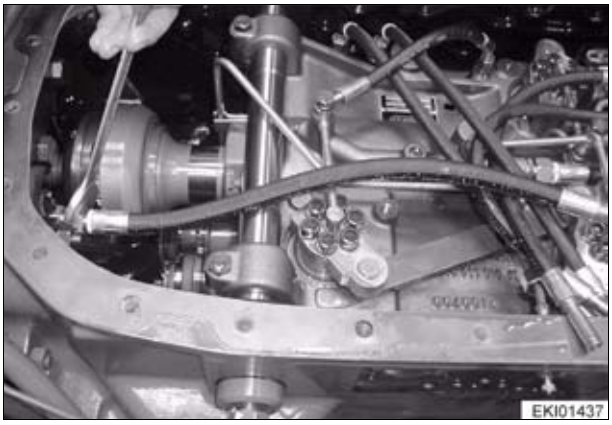


Fig. 49. I002828

1 High-pressure reverse sensor lines
2 System pressure, rear axle
3 Switching pressure, travel range I
4 Speed governor
5 Switching pressure, travel range II
6 System pressure
7 Control line for high-pressure limiting valves

Insert the pressure hoses in the transmission housing bores

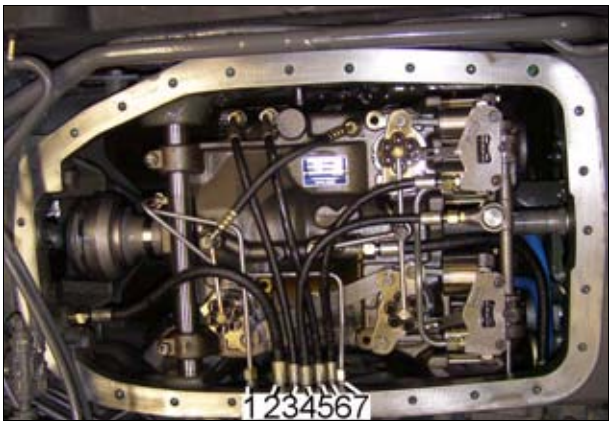


Fig. 50. I002906

Fitting the circlips

Fig. 51. I001829

Clean the sealing surfaces of the valve block and the housing, attach a new seal with a small amount of grease to the transmission housing, insert new O-rings and fit the valve block
Tighten the securing bolts
Torque: 25 Nm

Fig. 52. I001828

Place new O-rings into the valve housing with a small amount of grease and tighten the securing bolts
Torque: 25 Nm

Fig. 53. I002900

If necessary, fit the new shaft sealing ring and fill 2/3 with grease
Fit the actuator shaft

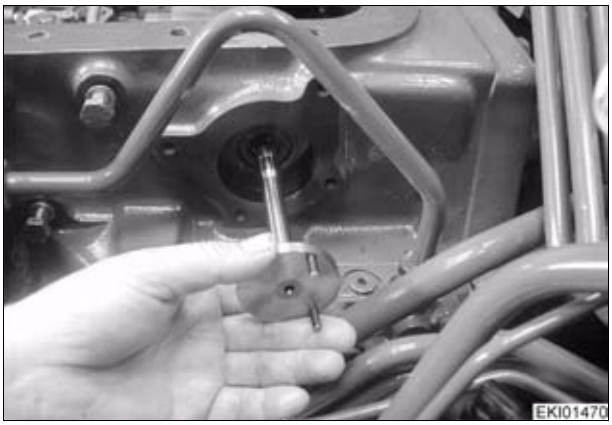


Fig. 54. I002896

Mate the depression in the actuator shaft with the threaded bore.

NOTE: *Coat the threads of the hex. screw with thread-lock compound and tighten to a torque of 25 Nm*

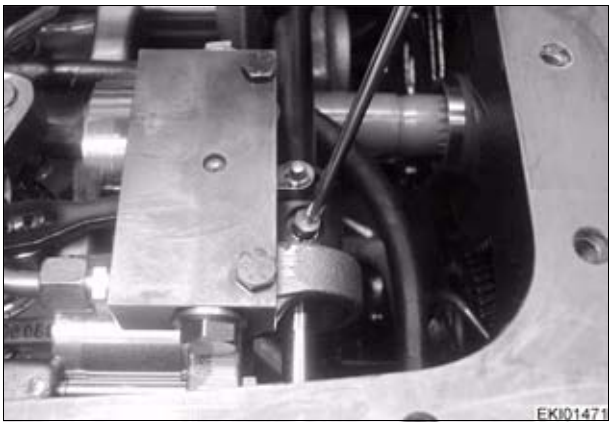


Fig. 55. I002897

Fit the emergency actuation unit

Fig. 56. I001826

Fit the coolant piping and tighten the screw coupling on the engine

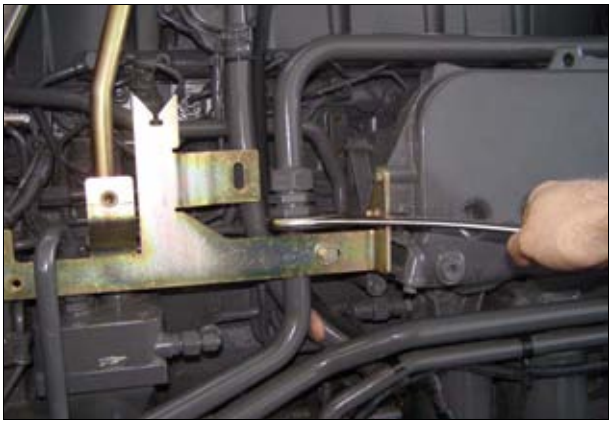


Fig. 57. I001825

Tighten the coolant piping on the valve housing

Fig. 58. I001822

Tighten the piping clamps

Fig. 59. I001824

Fit the hydraulic piping between the valve block and the valve housing

Fig. 60. I001821

Tighten the hydraulic piping

Fig. 61. I001820

Fit the actuator unit and tighten the hex. socket head screws
Torque: 25 Nm

Fig. 62. I001818

Fit the screw plugs on the underside of the transmission housing

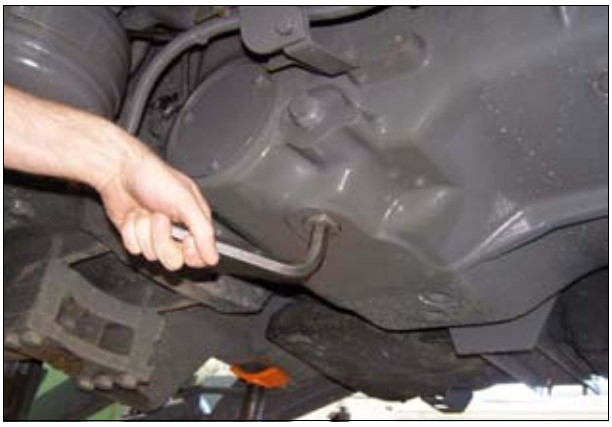


Fig. 63. I001718

Unscrew the plug to the PU connection
Connect the external oil filler
Observe instructions for oil type and quantity

NOTE: *During the filling process, pivot the hydraulic pumps and hydraulic motors by turning the actuator shaft. Monitor the visible hydraulic connections for leaks.*

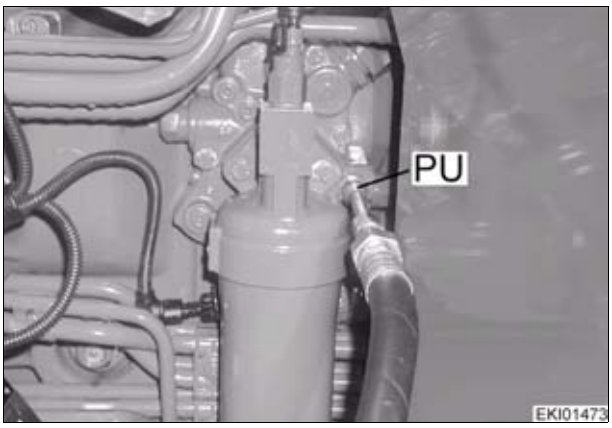


Fig. 64. I002899

Coat the clean sealing surfaces evenly with X903.050.074 sealing compound
Carefully raise the transmission housing cover and fit it

DANGER: Do not walk or stand under suspended loads!

Fig. 65. I001816

Tighten the housing cover bolts
Torque: 120 Nm

Fig. 66. I002901

Pass the bracket of the retaining strap underneath the hydraulic piping and slide the bracket sideways into position

Fig. 67. I001815

Tighten the bracket bolts

Fig. 68. I001813

Fit the left fuel tank retaining strap and tighten the nut

Fig. 69. I001812

Fit the compressed air bracket and tighten the bolts

Fig. 70. I001811

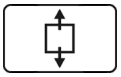
Final procedures:

– *see §6*
– *see §2*

3 Installing A009 actuator unit

A009 actuator unit
X037 separation point on actuator unit

On the right side of the transmission



Remove right rear wheel.
Remove metal panel

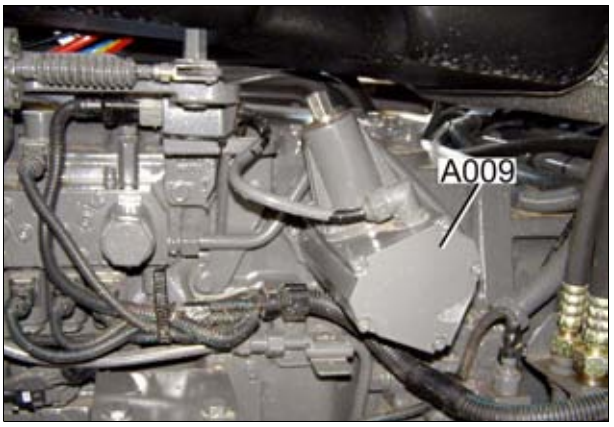


Fig. 71. I001024

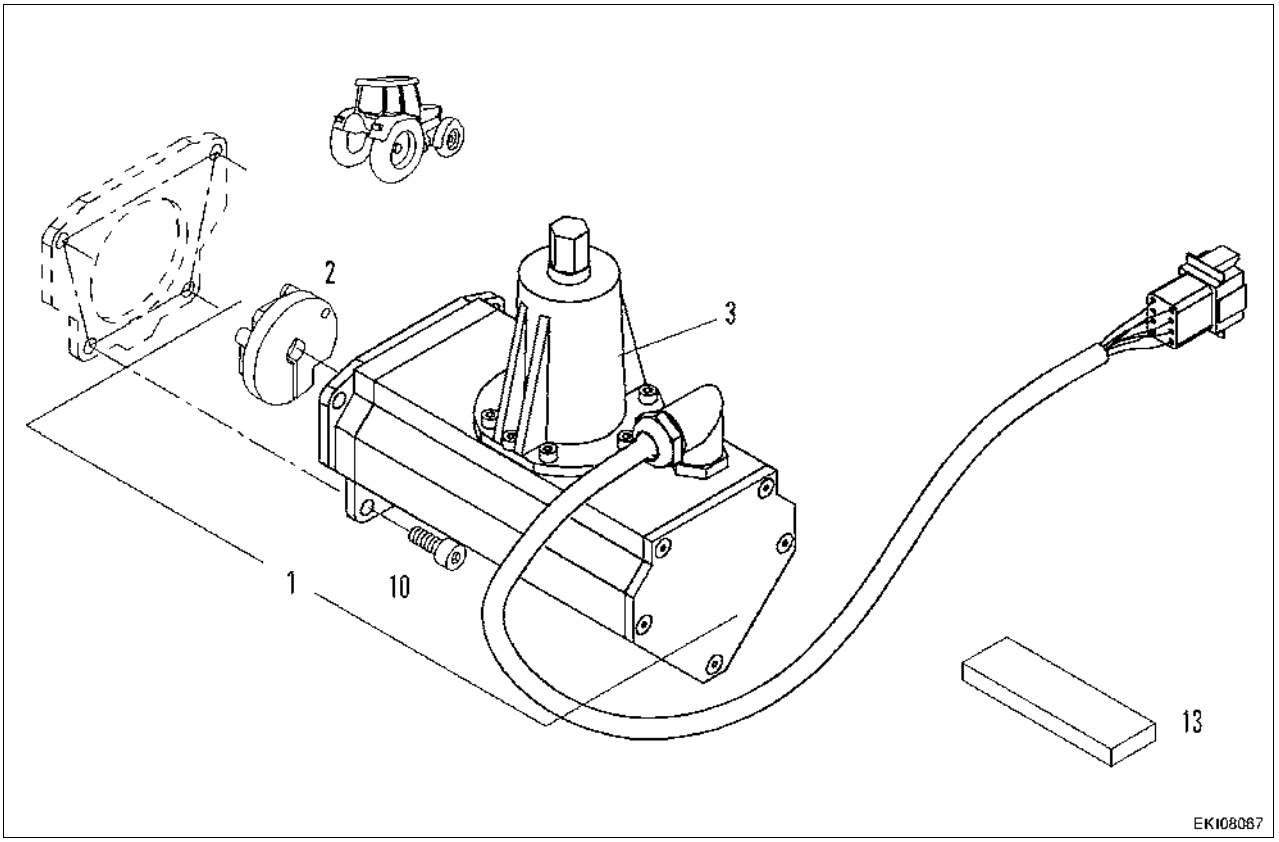


Fig. 72. I000691

Item	Designation	Item	Designation
1	A009 actuator unit	10	Socket head cap screw
2	Clutch	13	Sealing strip
3	Dome		

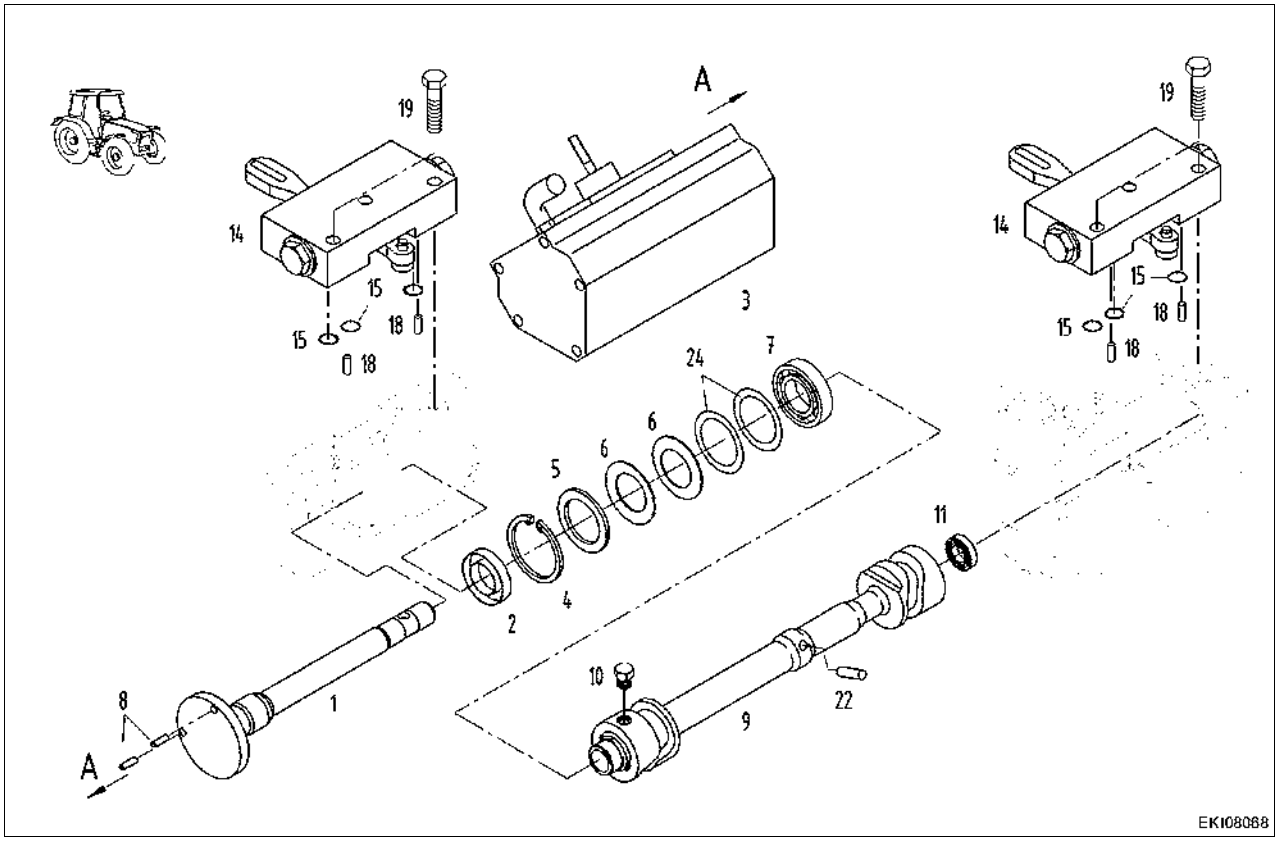


Fig. 73. I000690

Item	Designation	Item	Designation
1	Shaft	10	Hex screw
2	Shaft seal ring	11	Deep-groove ball bearing
3	A009 actuator unit	14	Governor
4	Circlip	15	O-ring
5	Locating ring	18	Dowel pin
6	Belleville spring	19	Hex screw
7	Deep-groove ball bearing	22	Parallel pin
8	Pin	24	Shim pack
9	Actuator shaft		

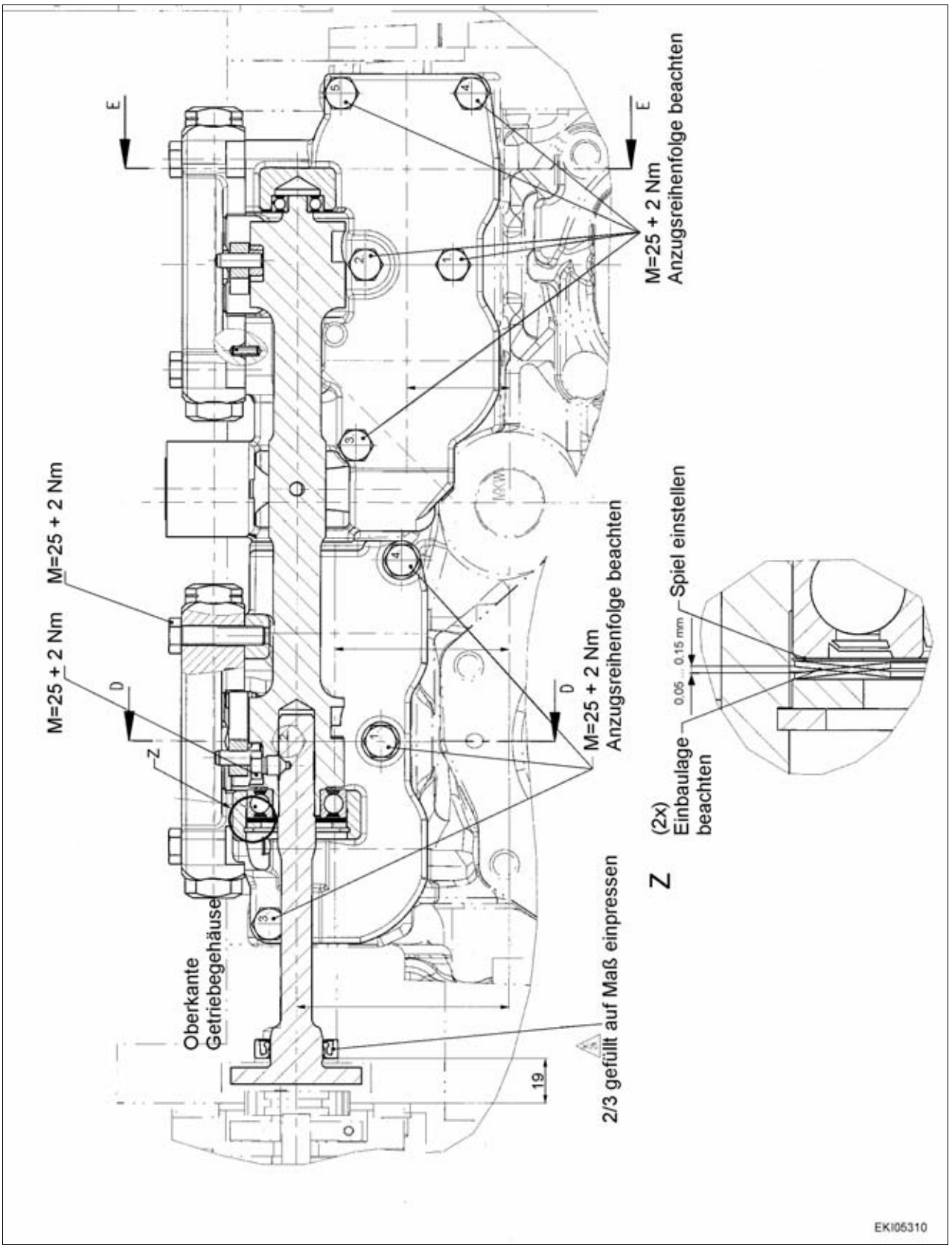


Fig. 74. I007374

Connect carrier coupling with the two increases (arrow) pointing towards the actuator unit

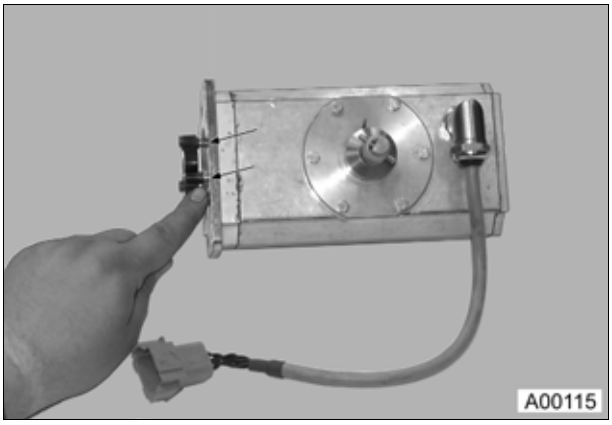


Fig. 75. I000711

Fit pre-mounted actuator unit to the transmission housing

Tighten the M8 socket head cap screws to 25 Nm

Connect electrical cables

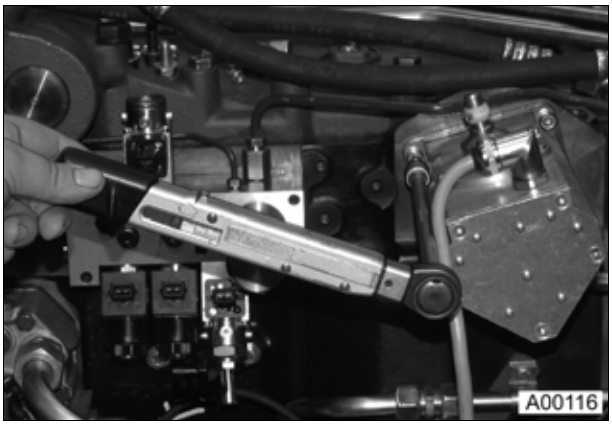


Fig. 76. I000712

4 Replacing high-pressure limiting valve

Preliminary work: Drain off transmission oil (approx. 87 l), unscrew the two screw plugs on the underside of the transmission.

Dismantle 2V3 or 2V4 using socket spanner (SW 27)

NOTE: *2V3 = high-pressure limiting valve, forwards*
2V4 = high-pressure limiting valve, reverse

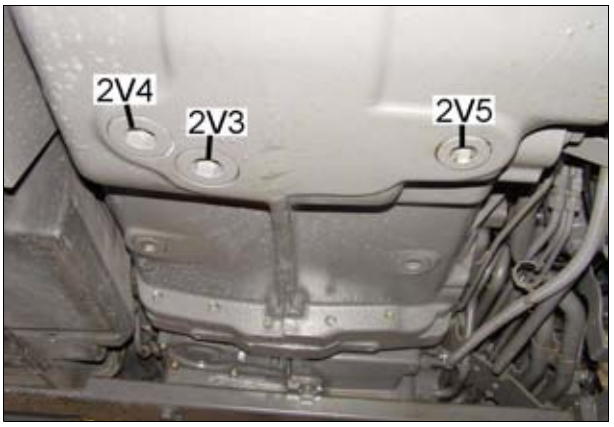


Fig. 77. I002226

The high-pressure limiting valves are servo-assisted pressure limiting valves.

New pressure setting: 540 bar

Used pressure setting: 520 ± 20 bar

Only replace O-rings if they are damaged, take care with the positioning of the support rings

Tighten the2V3 and 2V4 to 250 + 20 Nm, tighten the plug screws to 100 Nm

Fig. 78. I002228

IMPORTANT: *If a high-pressure limiting valve (2V3 or 2V4) was dismantled for inspection, the transmission must be topped up using the external filling station!*

Fig. 79. I002250

5 Replacing the purge valve

Preparatory work: Drain off transmission oil (approx. 87 l), unscrew the screw plugs on the underside of the transmission.

Dismantle the **2V5 = purge valve** using a socket wrench (SW 22)

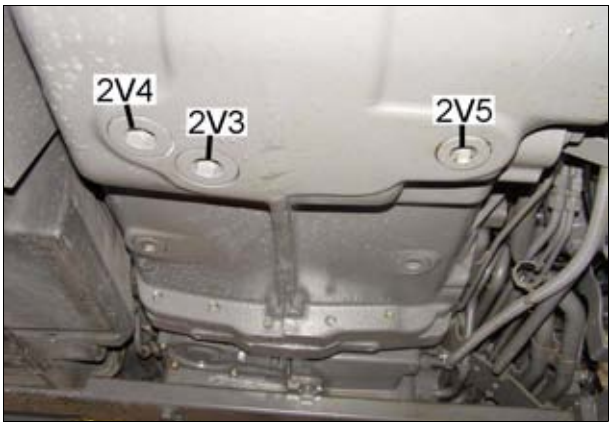


Fig. 80. I002226

Only replace the O-rings if they are damaged. Check the position of the support rings. The support rings face towards each other.

Tighten the 2V5 = purge valve to 250 + 20 Nm, tighten the screw plugs to 100 Nm

Fig. 81. I002227

IMPORTANT: *If the purge valve (2V5) was dismantled for inspection, the transmission must be topped up using the external filling station!*

Fig. 82. I002250

6 Top up the transmission oil

During normal maintenance work, e.g. transmission oil change and/or filter change, top up transmission oil at rear left.
Observe instructions for oil type and quantity.
First filling approx. 87 l
Refilling approx. 67 l

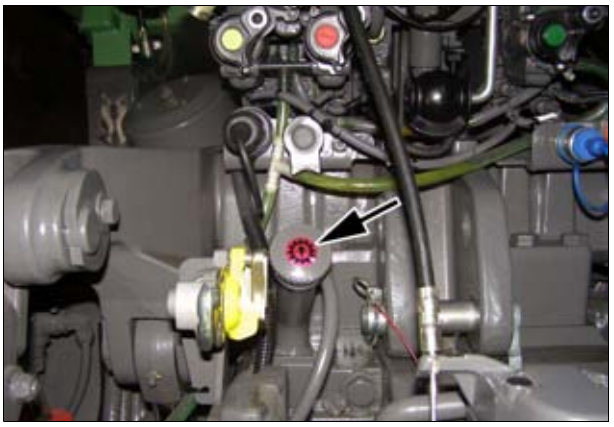


Fig. 83. I002902

Topping up the oil is always necessary when:

1. Replacing the transmission unit (ML transmission)
2. When high-pressure unit is empty, e.g. after removal of high-pressure valves or the discharge valve (purge valve)

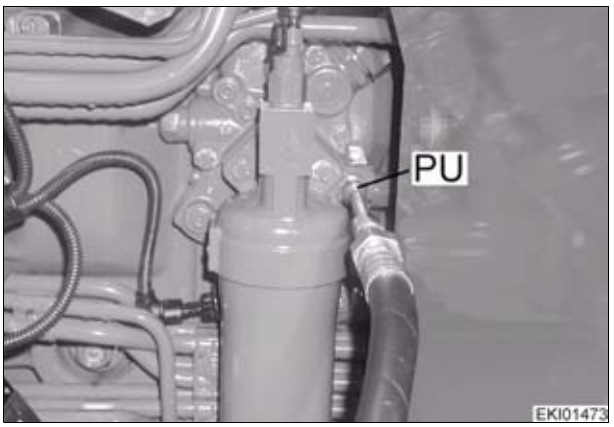


Fig. 84. I002904

1 Suction hose from oil reservoir
2 Vacuum gauge
3 Pump
4 230 V AC electric motor drive
5 Microfilter with filter monitor
6 Pressure hose to tractor
7 Pressure hose to the oil cleaner of the service hydraulics (does not operate when external oil filler function is in use)

NOTE: *Using the external oil filler unit prevents the hydraulic pump and hydraulic motors from running dry*

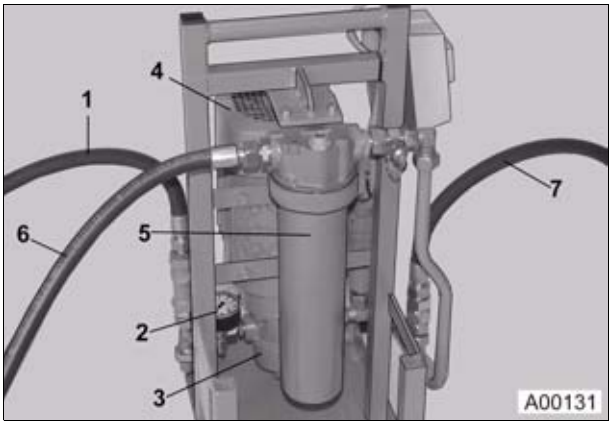


Fig. 85. External oil filler unit with microfilter I002909

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1 Technical drawing of front PTO

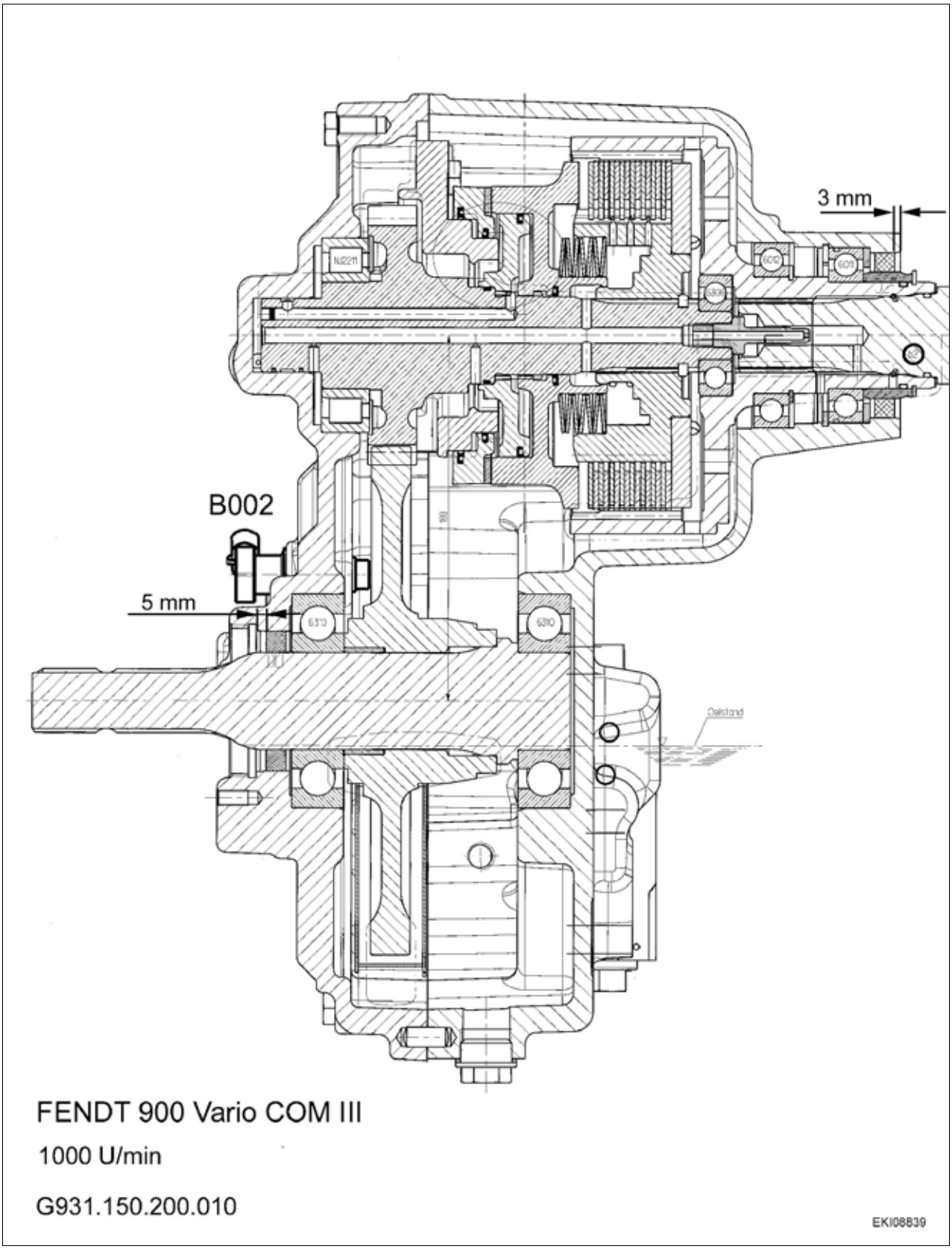

Fig. 1. Front PTO transmission I002975

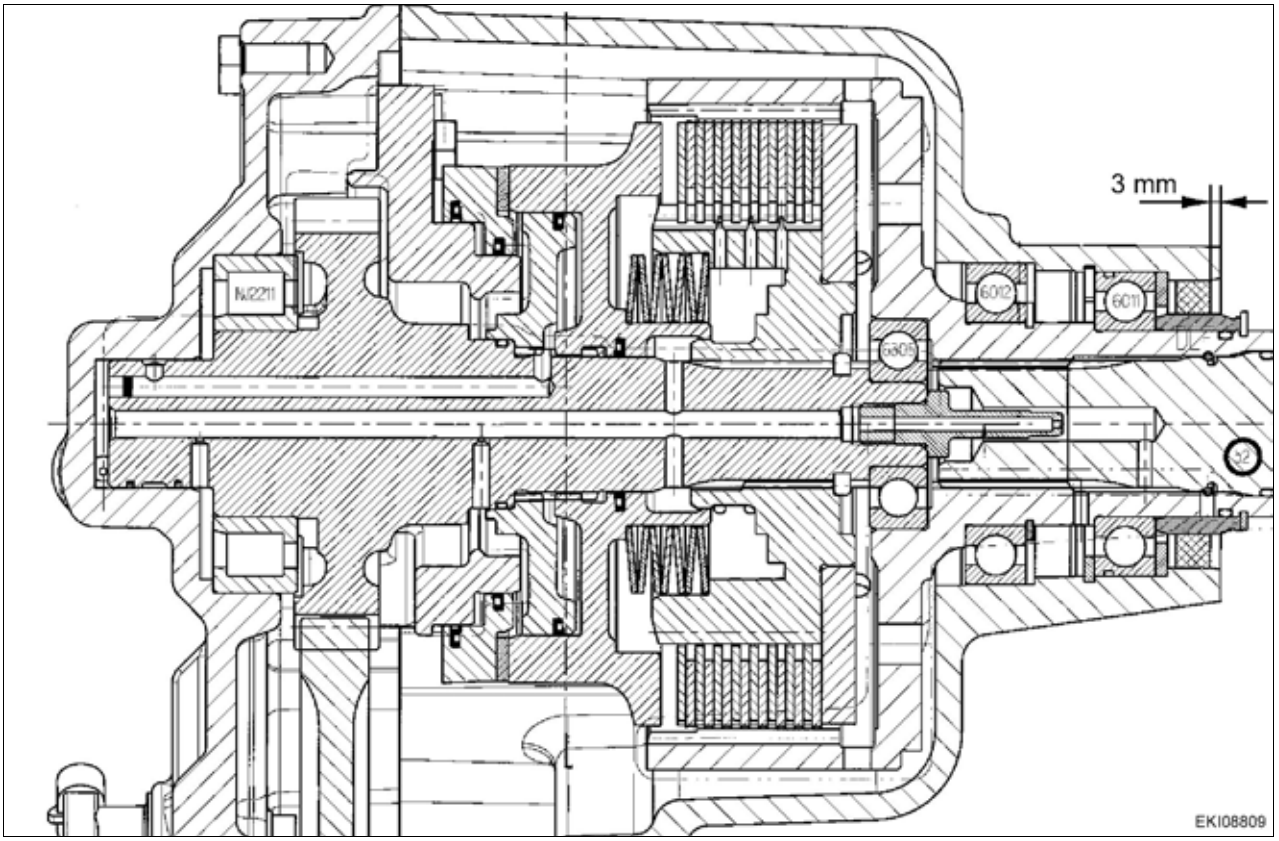

Fig. 2. Front PTO clutch I003543

2 Technical drawing: front PTO drive

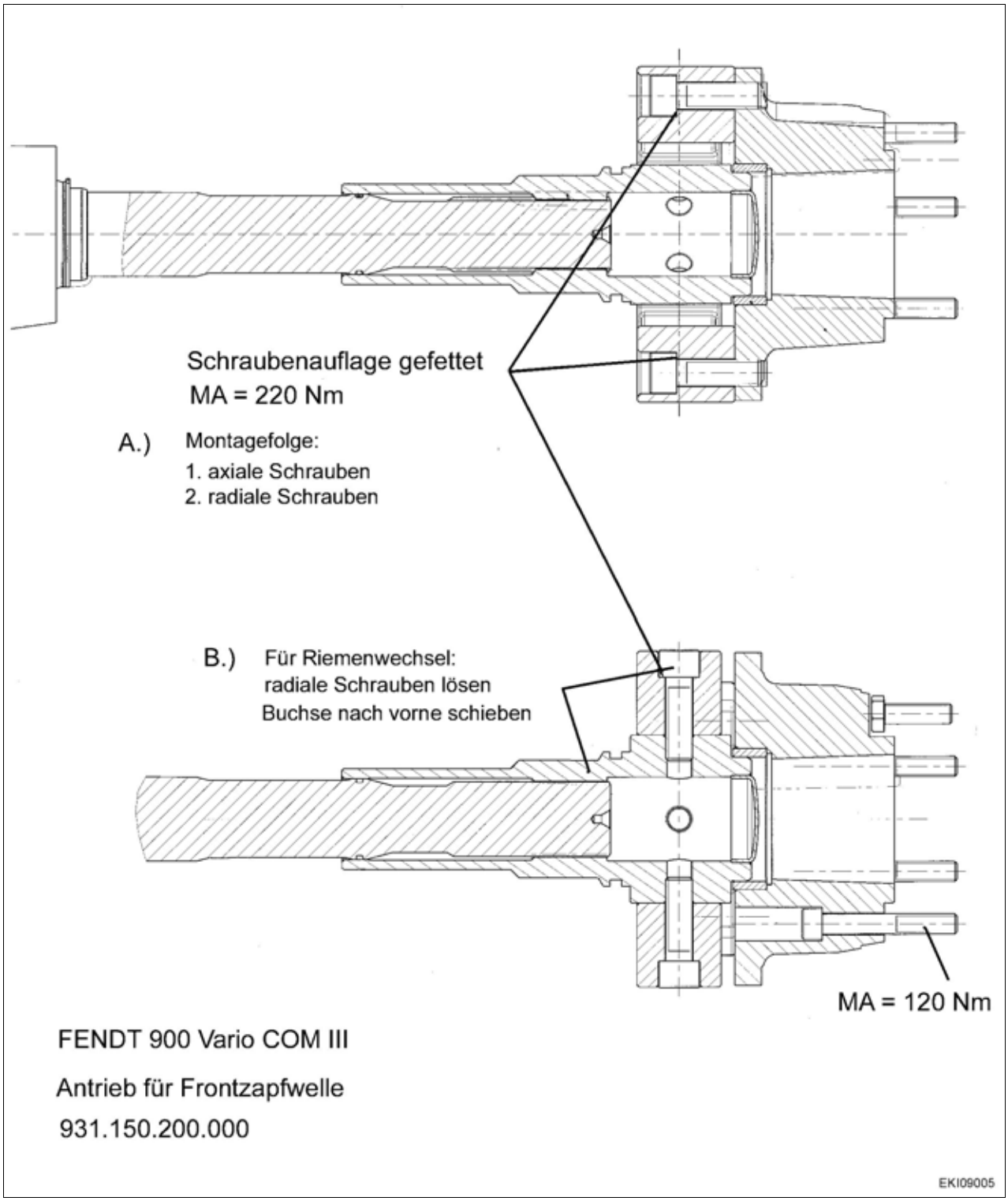

Fig. 3. I003561

A.)
Greased screw seat
Assembly sequence:
1. Tighten axial bolts (tightening torque = 220 Nm)
2. Tighten radial bolts (tightening torque = 220 Nm)

B.)
For drive belt change:
Loosen the radial bolts and slide the bush forwards

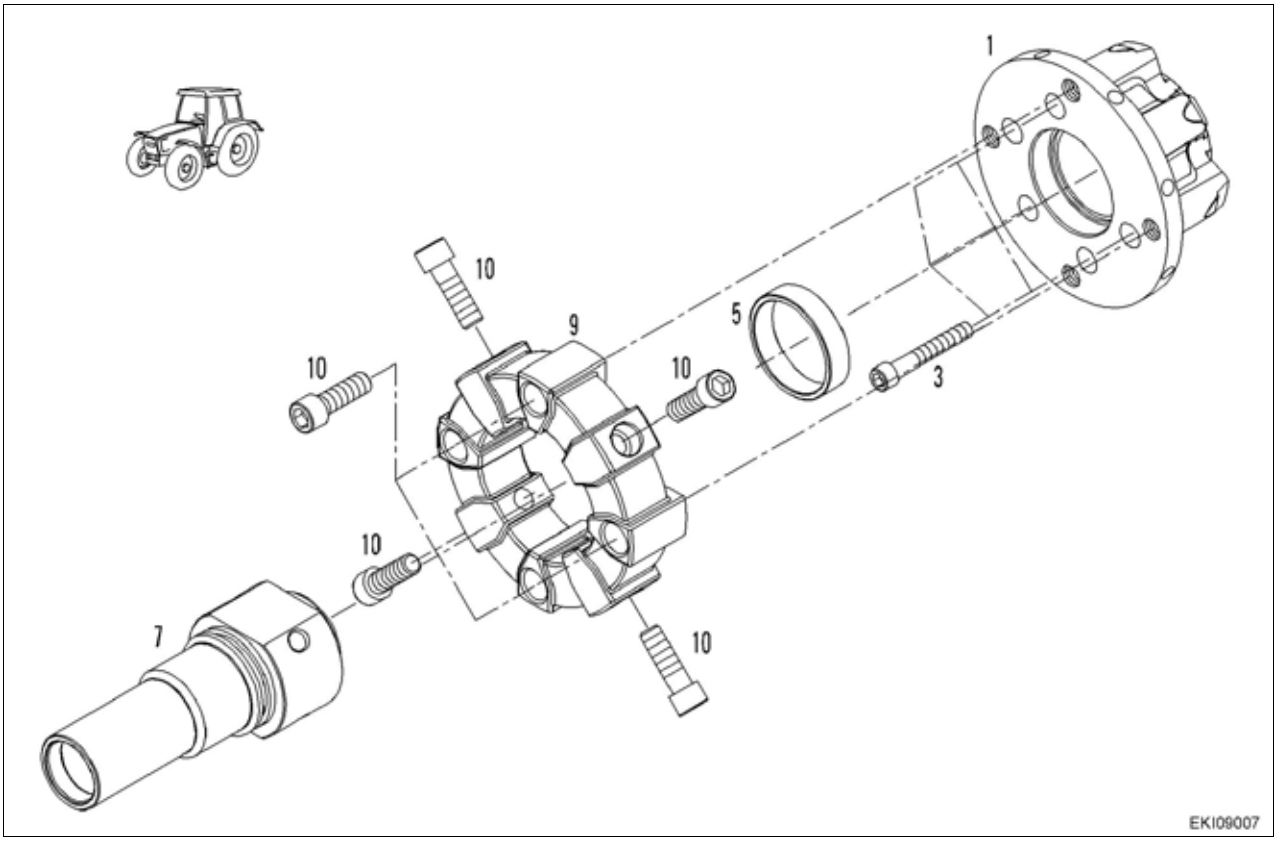

Fig. 4. I003562

Item	Designation	Item	Designation
1	Adapter	7	Connecting sleeve
3	Socket head cap screw	9	Clutch
5	Bush	10	Socket head cap screw

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-

E Measuring and testing

1 Checking the front PTO system and clutch pressure. 13

1 Checking the front PTO system and clutch pressure

Circuit diagram: Front PTO valve block

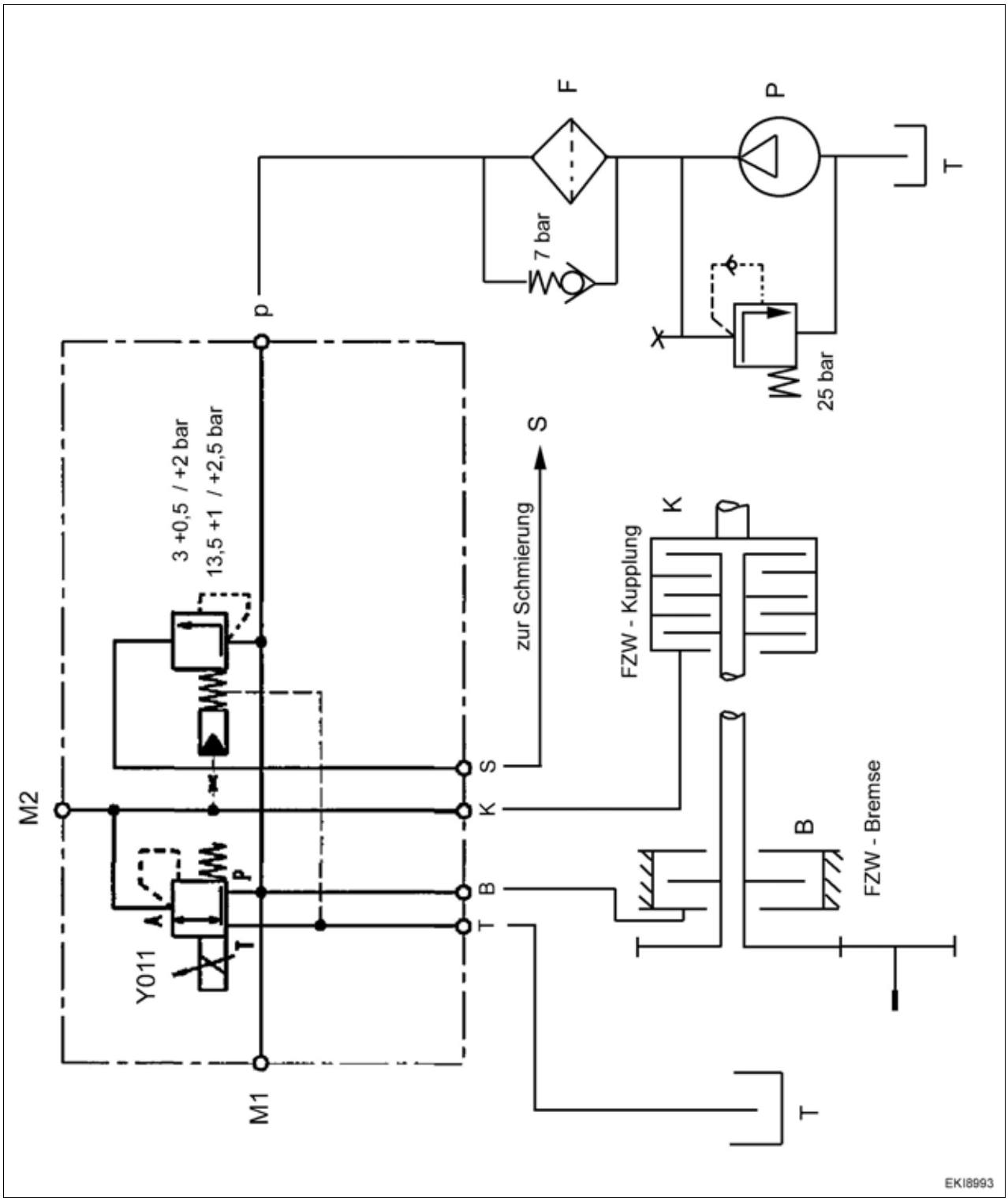

Fig. 1. I003545

Item	Designation	Item	Designation
B	Front PTO - brake	**F**	Oil filter: **Bypass = 7 bar**
K	Front PTO - clutch	**Y011**	Front PTO solenoid valve **Front PTO OFF= 0 ADC** **Front PTO ON = approx. 1.7 ADC**
p	Hydraulic pump: **Pressure-limiting valve (DBV): 25 bar**	**M1**	System pressure
S	Lubrication	**M2**	Clutch pressure
T	Tank (front axle housing)		

Functional description

Y011 solenoid valve de-energised	**- Front PTO - clutch (K)** bleeds to tank (front axle housing) - **The front PTO clutch (K) is open** **-** The pressure-limiting valve is set to **approx. 4 bar** **-** The counter piston of the **front PTO brake (B)** is pressurised with approx. 4 bar . **- The front PTO brake (B) is closed with the help of spring force**
Y011 solenoid valve energised (approx. 1.7 ADC)	**-** The pressure-limiting valve is set to approx. 17 bar **-** The front PTO clutch (K) is pressurised with approx. 17 bar . **The front PTO clutch is closed** **The front PTO brake (B) is open**

Check the clutch pressure and system pressure

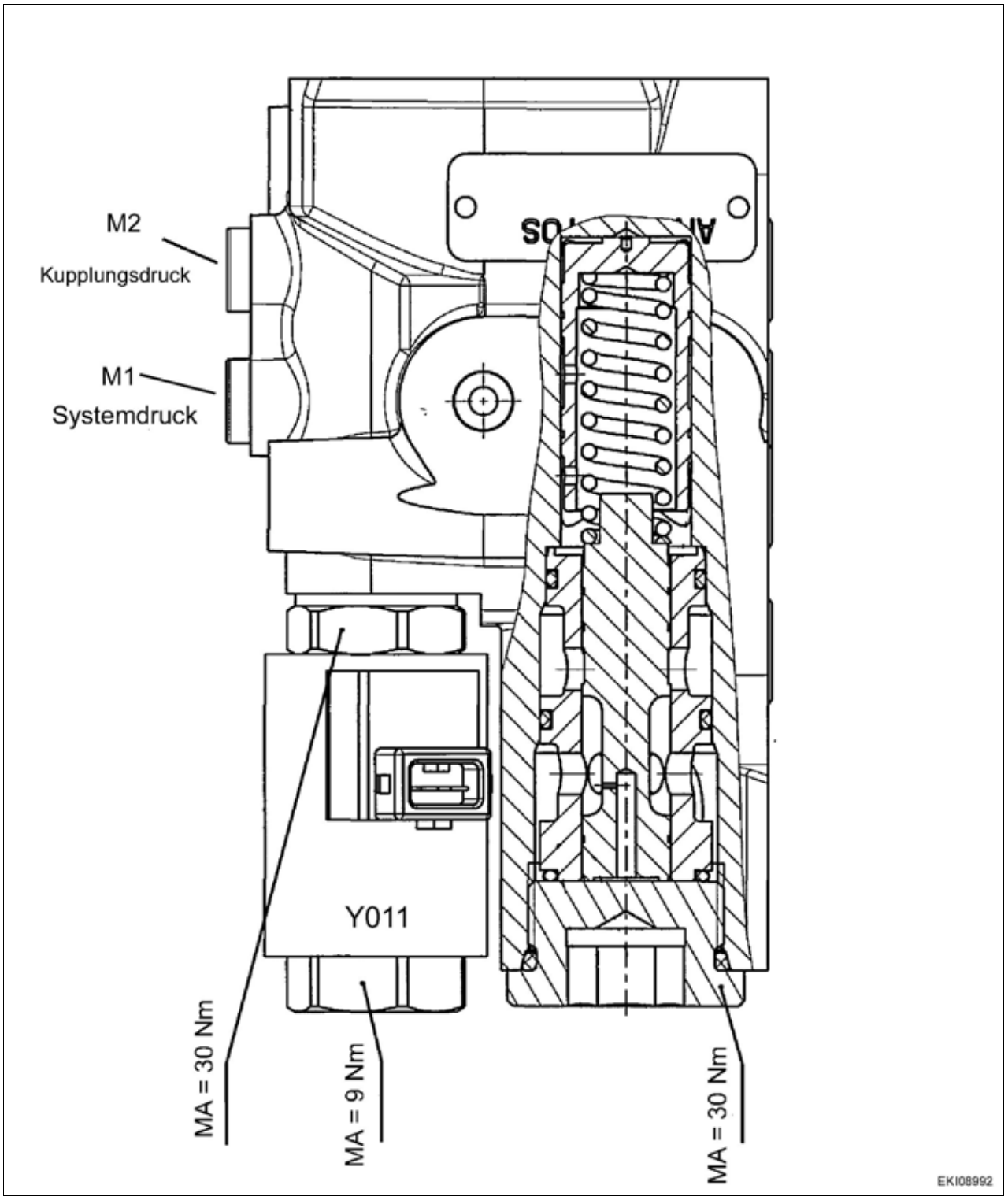

Fig. 2. I003548

M1 = system pressure
M2 = clutch pressure

at the on front PTO transmission

Fig. 3. I003549

	System pressure (M1)	Clutch pressure (M2)
Front PTO OFF Y011 solenoid valve de-energised (clutch open, brake closed)	approx. 4 bar	0 bar
Front PTO ON Y011 solenoid valve energised (clutch closed, brake open)	approx. 17 bar	approx. 17 bar

Hydraulic oil supply

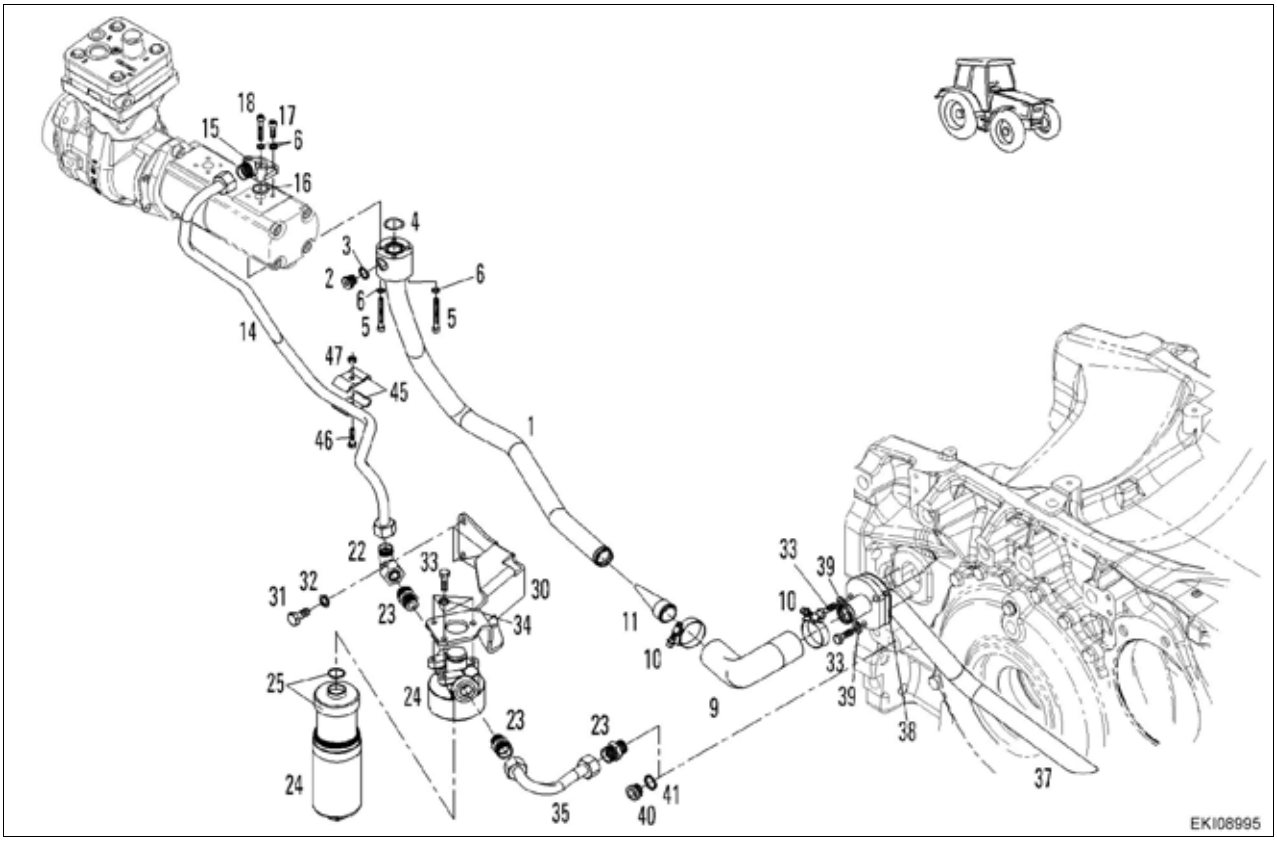

Fig. 4. I003552

Item	Designation	Item	Designation
1	Suction pipe	**24**	**Filter**
2	Screw plug	**25**	**Filter cartridge**
3	Seal ring	30	Retainer
4	O-ring	31	Hex screw
5	Socket head cap screw	32	Spring washer

Item	Designation	Item	Designation
6	Spring washer	33	Hex screw
9	Hose bend	34	Spring washer
10	Hose clamp	35	Pressure pipe
11	**Prefilter strainer**	37	Suction pipe
14	Pressure pipe	38	Gasket
15	Flange socket	39	Washer
16	O-ring	40	Screw plug (only for 1-circuit brake)
17	Socket head cap screw	41	Seal ring
18	Socket head cap screw	45	Clamp
22	Screw coupling	46	Hex screw
23	Screw socket (not applicable for 1-circuit brake)	47	Hex nut

Checking the hydraulic pump

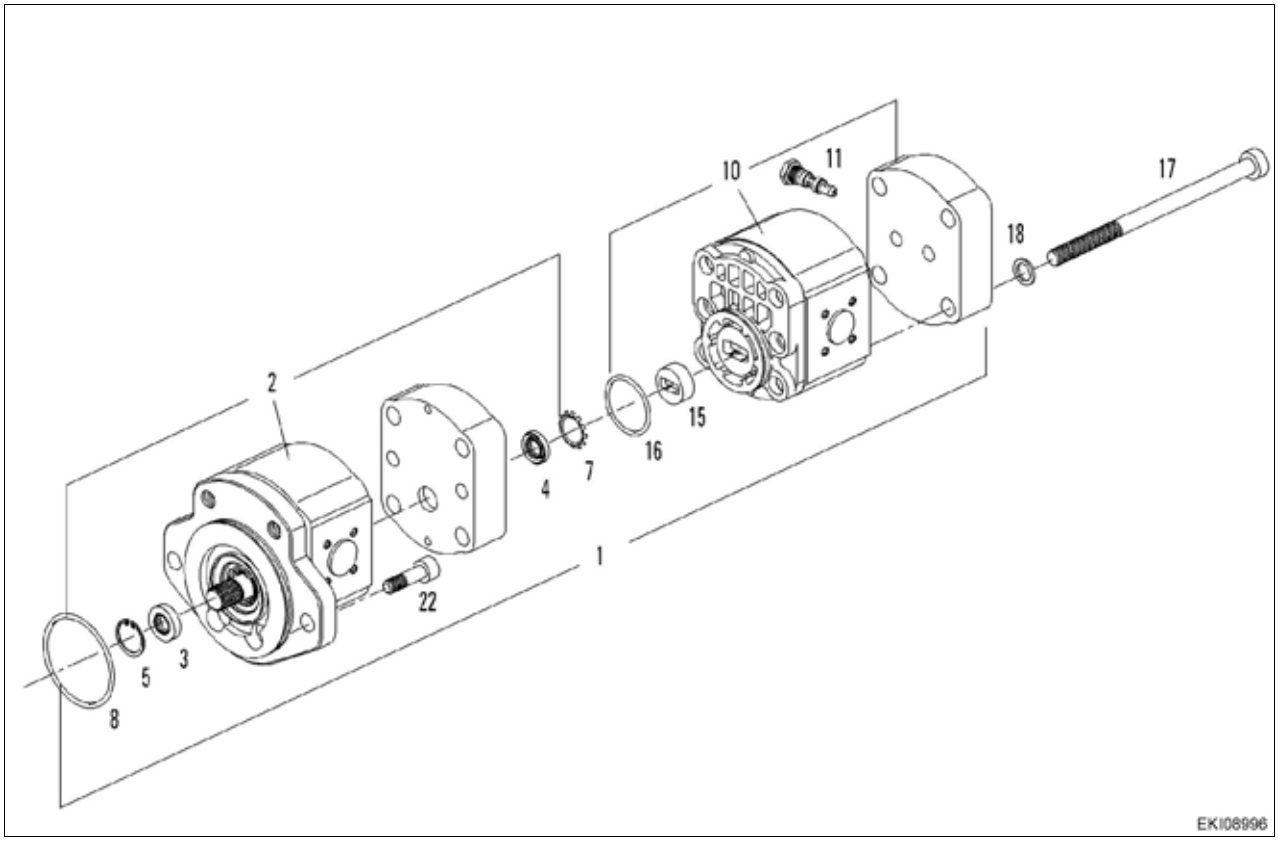

Fig. 5. I003559

Item	Designation	Item	Designation
1	**Tandem pump:** PH - auxiliary pump for the working and steering hydraulics (22.5 cc) **Front PTO pump** Tractors with 1-circuit brake and front PTO (8 ccm) Tractors with 2-circuit brake and front PTO (16 ccm)	**10**	**Front PTO pump** Tractors with 1-circuit brake and front PTO (8 ccm) Tractors with 2-circuit brake and front PTO (16 ccm)
2	PH - auxiliary pump for the working and steering hydraulics	**11**	**Pressure-limiting valve (DBV): 25 bar**
3	Shaft seal ring	15	Carrier

Item	Designation	Item	Designation
4	Shaft seal ring	16	Seal ring
5	Circlip	17	Socket head cap screw
7	Notched ring	18	Washer
8	O-ring	22	Socket head cap screw

Description	Delivery rate	Oil pressure
Tractors with 1-circuit brake and front PTO **Pump (8 cc)**	8 cc/revolution Drive ratio = 0.896 **9 l/min.** (engine speed 1000 rpm) **18 l/min.** (engine speed 2000 rpm)	25 bar
Tractors with 2-circuit brake and front PTO **Pump (16 cc)**	16 cc/revolution Drive ratio = 0.896 **17 l/min.** (engine speed 1000 rpm) **35 l/min.** (engine speed 2000 rpm)	25 bar

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Transmission / Live PTO

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1 Technical drawing of live PTO

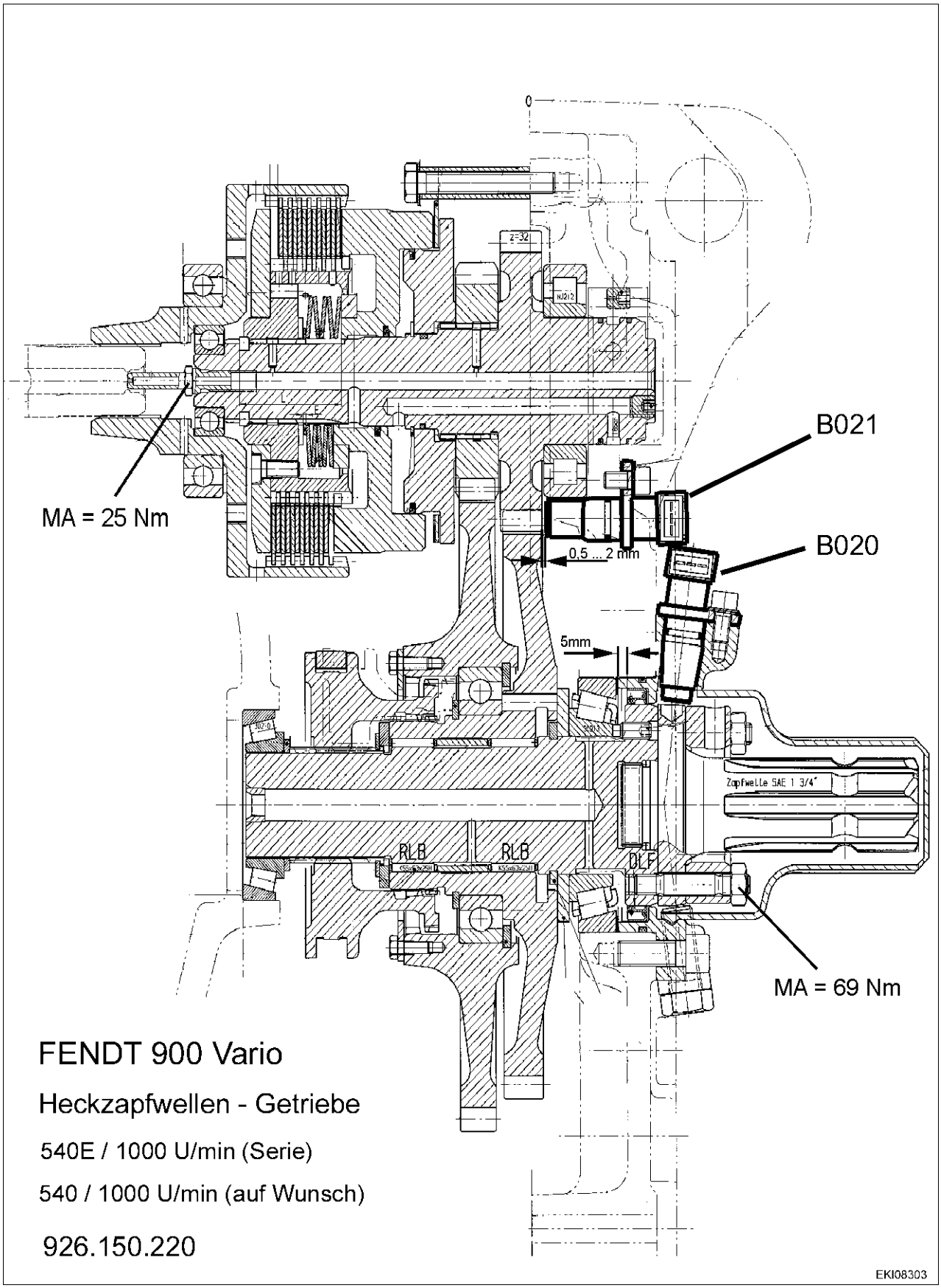

Fig. 1. I001469

G Repair

1 Assembling and removing live PTO clutch 11
2 Assembling and dismantling live PTO clutch and gears 22

1 Assembling and removing live PTO clutch

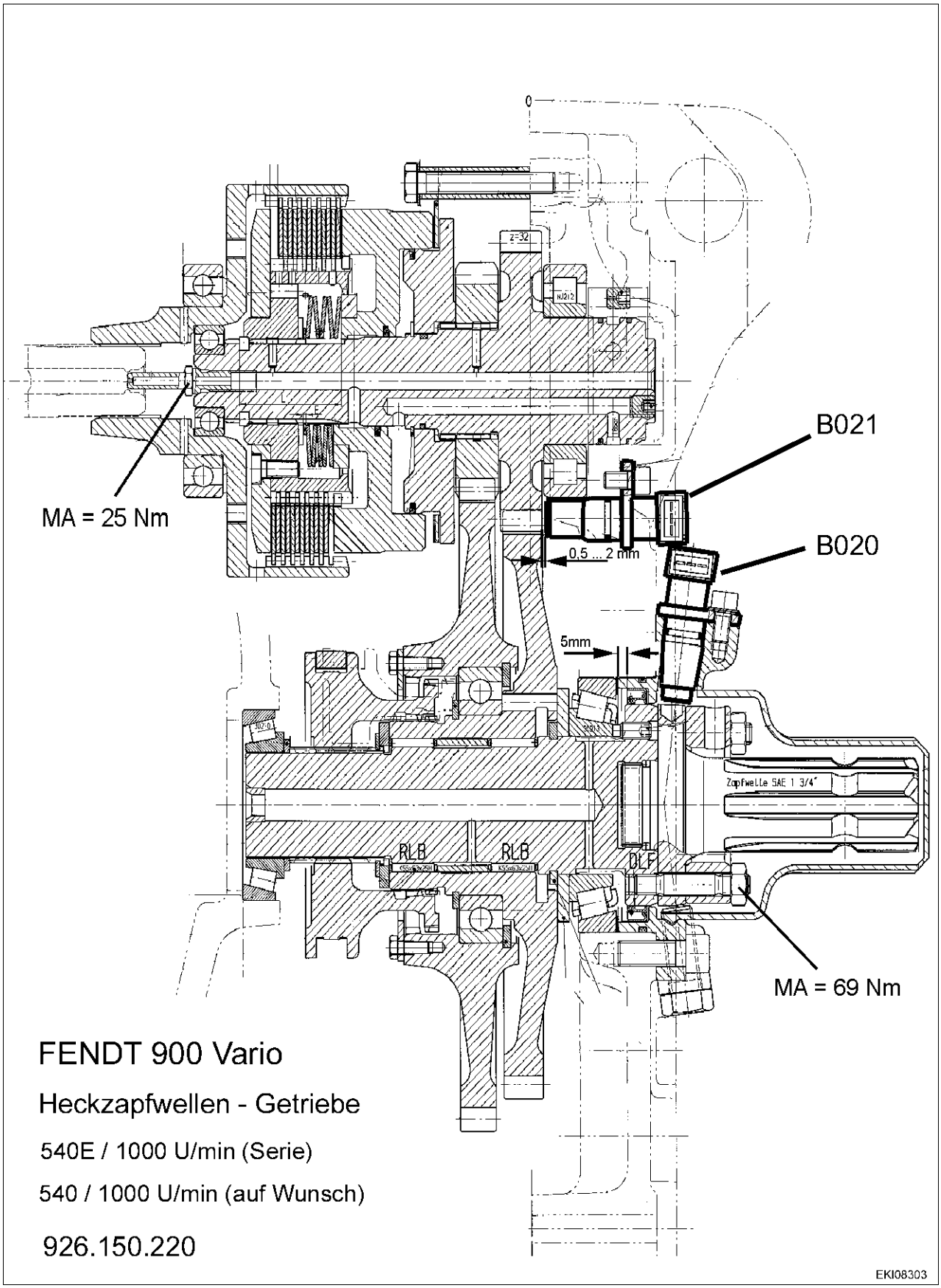

Fig. 1. I001469

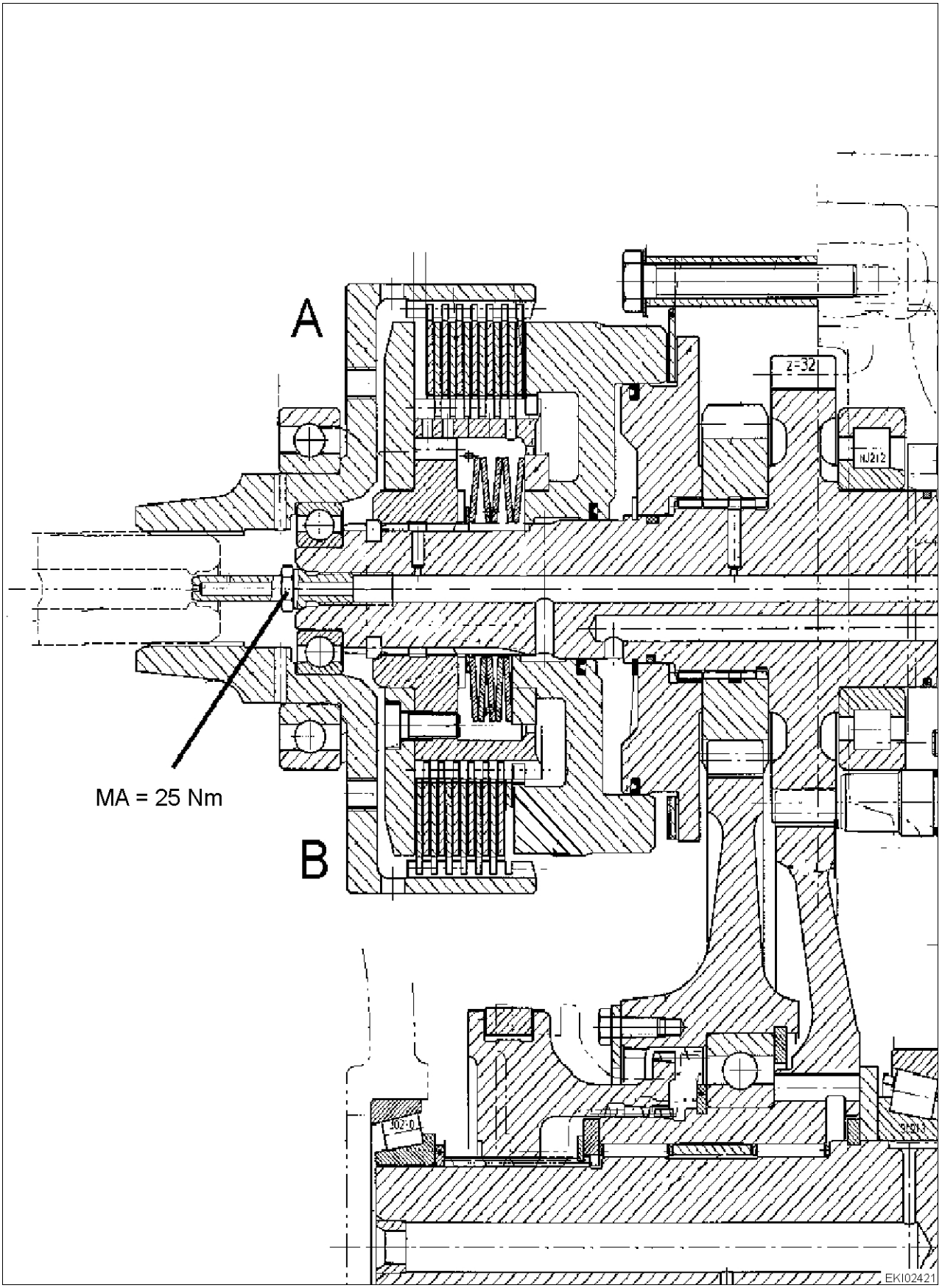

Fig. 2.
I003639

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

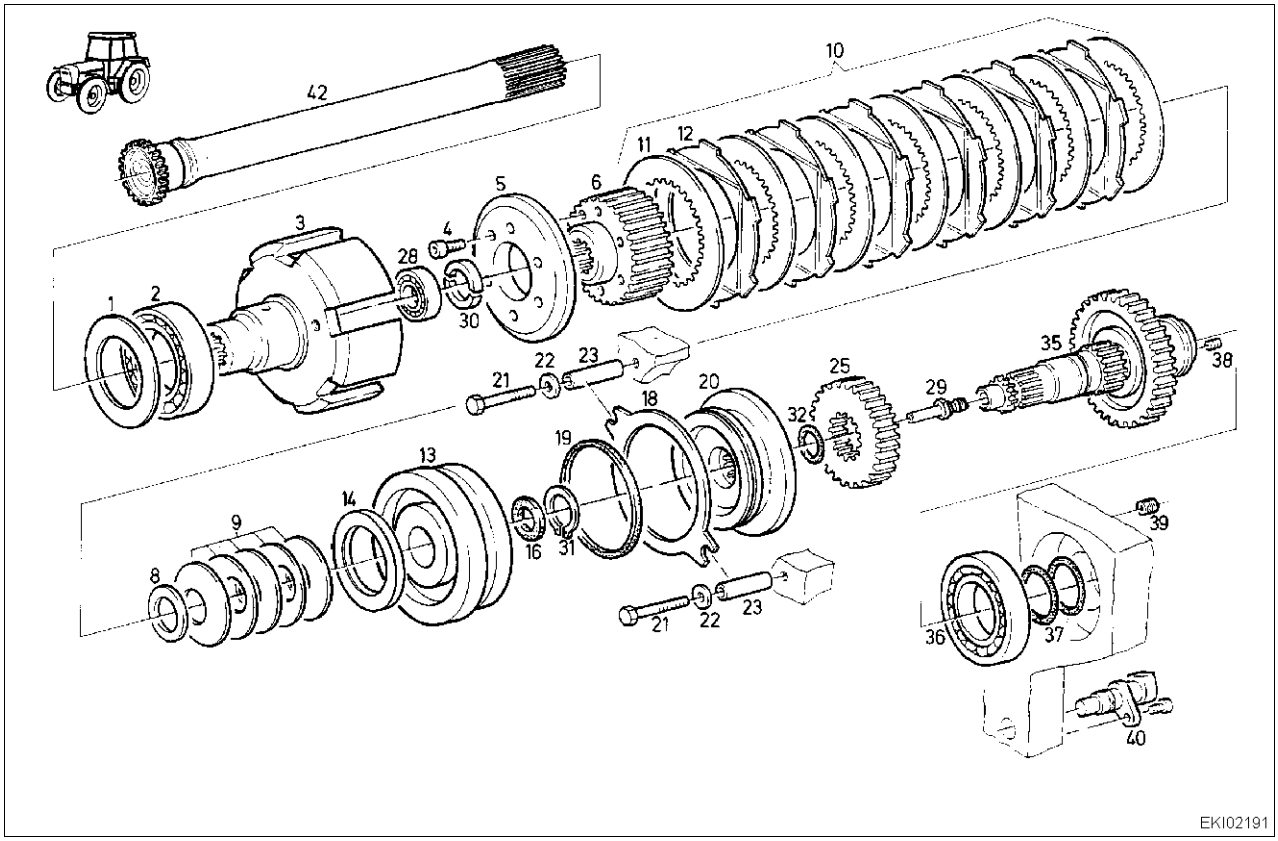

Fig. 3. I003640

Item	Designation	Item	Designation
1	Shim	21	Hex screw
2	Deep-groove ball bearing	22	Spring washer
3	Bell housing	23	Bush
4	Socket head cap screw	25	Spur gear
5	Locating ring	28	Deep-groove ball bearing
6	Internally toothed disc carrier	29	Nozzle
8	Shim	30	Half-ring
9	Belleville spring	31	Circlip
10	Disc package (11, 12)	32	O-ring
11	Externally toothed disc	35	Shaft
12	Internal disc	36	Cylinder roller bearing
13	Piston	37	Rectangular-section ring
14	Ring	38	Setscrew
16	Lip seal	39	Nozzle
18	Disc	40	B021 rear PTO clutch speed sensor
19	Lip seal	42	Shaft
20	Brake disc		

Preliminary work:
- Lower the rear power lift
- Drain transmission oil (approx. 67 l)
- Remove the trailer hitch
- Mark and unplug the X169 separation point at the B020 rear PTO stub shaft sensor
- Mark and unplug the X170 separation point at the B021 rear PTO clutch speed sensor
- Unscrew the compressed air couplings

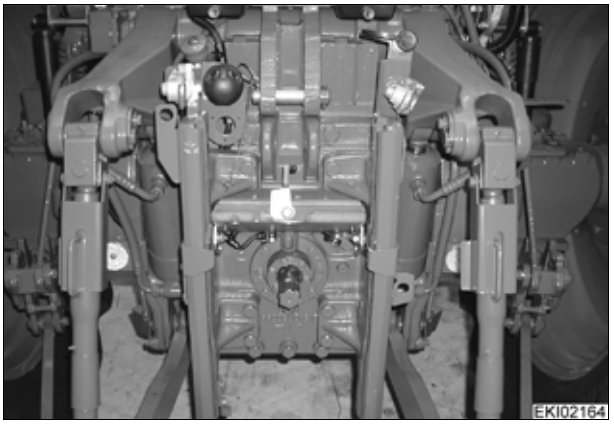

Fig. 4. I003641

Unscrew all fixing bolts and nuts.
Remove the plugs from the threaded bores and screw in two jack screws M12 (arrows).
Secure the housing cover in the hoist and release the housing cover.

WARNING: Do not walk or stand under suspended loads!

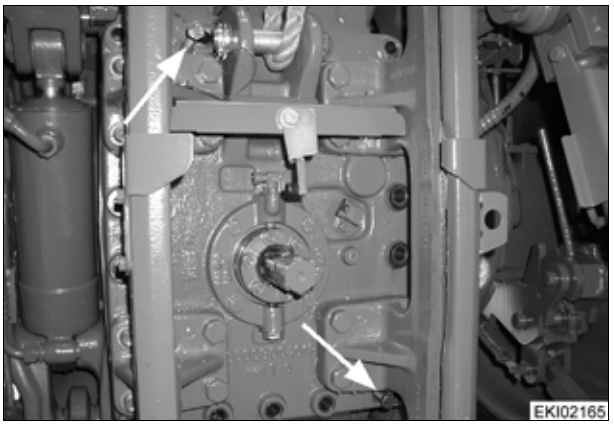

Fig. 5. I003642

Remove the housing cover (with rear PTO).

NOTE: *Take note of the shim (1).*
The washer (1) is used to adjust the bearing play

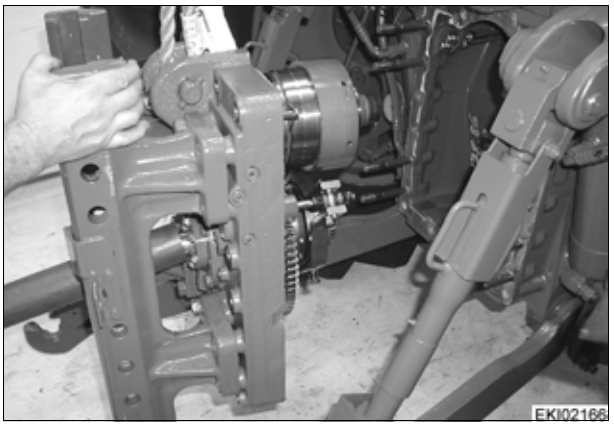

Fig. 6. I003643

Dismantling the PTO clutch

Press in the clutch bell housing (3) with the help of two hex screws.

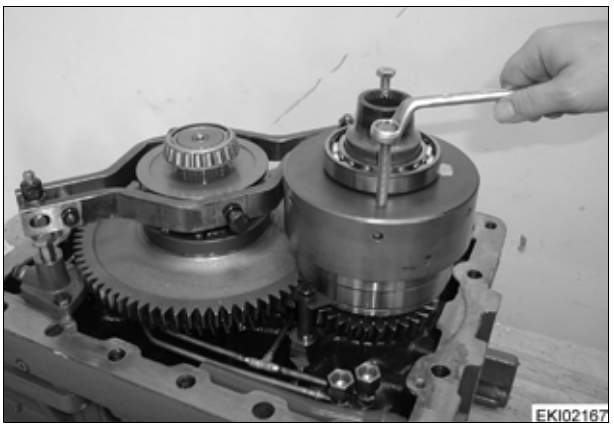

Fig. 7. I003644

Remove the nozzle (29)

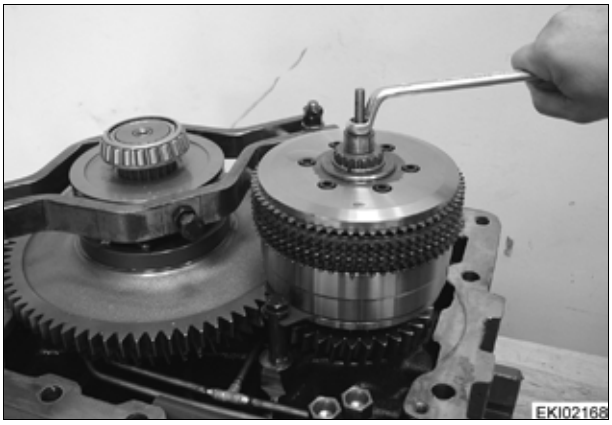

Fig. 8. I003645

Set up the X899.980.145 jig.
Tighten the clutch.
Remove the half-rings (30)
Remove the internal toothed disc carrier (6) and disc package (10).

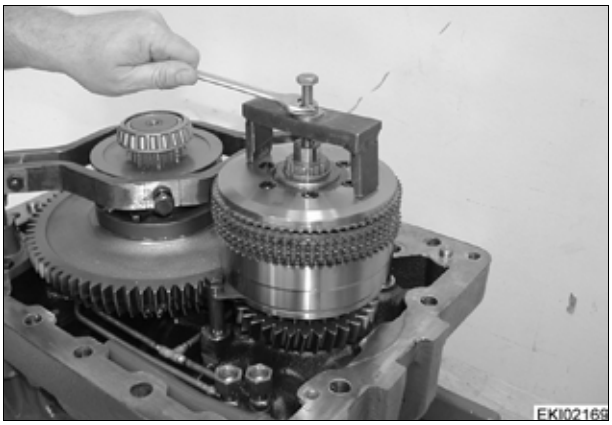

Fig. 9. I003646

Remove the washers (8), belleville spring package (9) and ring (14)

Fig. 10. I003647

Remove the piston (13)

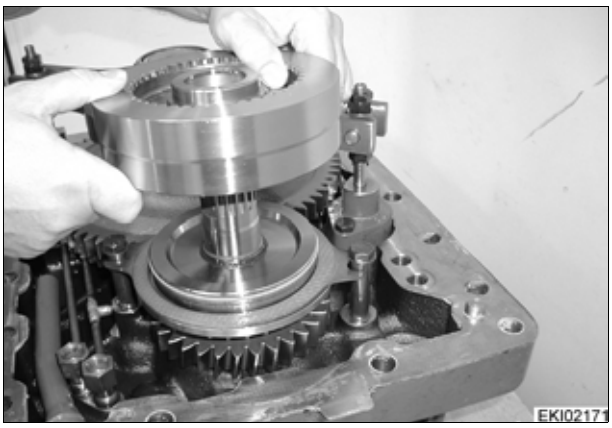

Fig. 11. I003648

Remove one hex screw (21) and dismantle the disc (18).

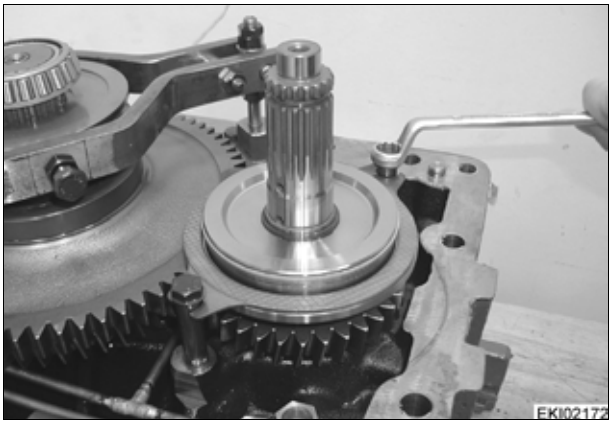

Fig. 12. I003649

Snap out the circlip (31) and remove the brake disc (20).

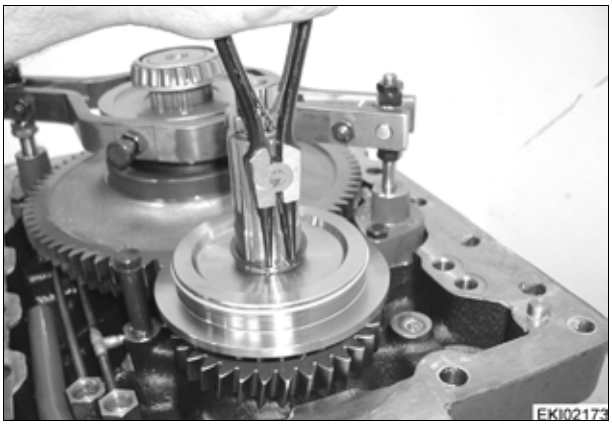

Fig. 13. I003650

Assembling the PTO clutch

Place the new O-ring (32) in the groove of the shaft (35) and grease it.
Check the brake disc (20) for damage.
If necessary, fit a new brake disc (20).

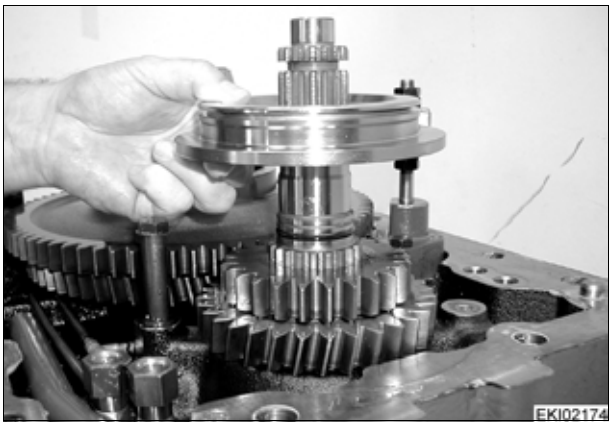

Fig. 14. I003651

Put the circlip (31) in place.
Place the new lip seal (19) with the seal facing the oil chamber in the groove of the brake disc (20) and grease it.

NOTE: *See also:*
Technical drawing

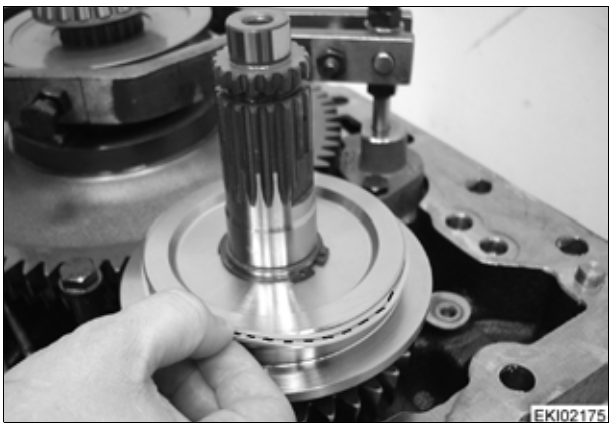

Fig. 15. I003652

Put the disc (18) in place.
Coat the threads of the hex screw (21) with X 903.054.084 synthetic bonding agent.
Attach the spring washer (22) and bush (23).
Tighten the hex screw

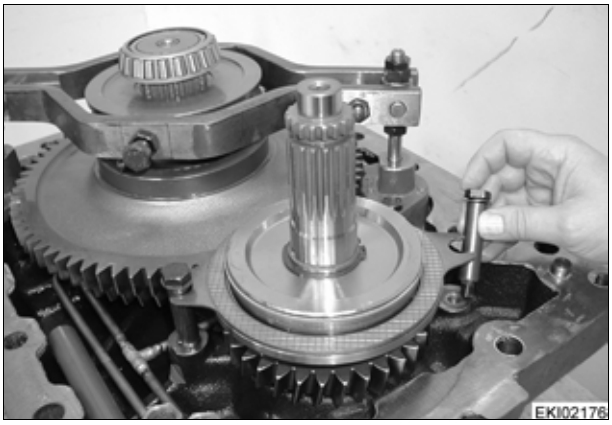

Fig. 16. I003653

Place the new lip seal (16) with the seal facing the oil chamber in the inner groove of the piston (13) and grease it.

NOTE: *See also:*
Technical drawing

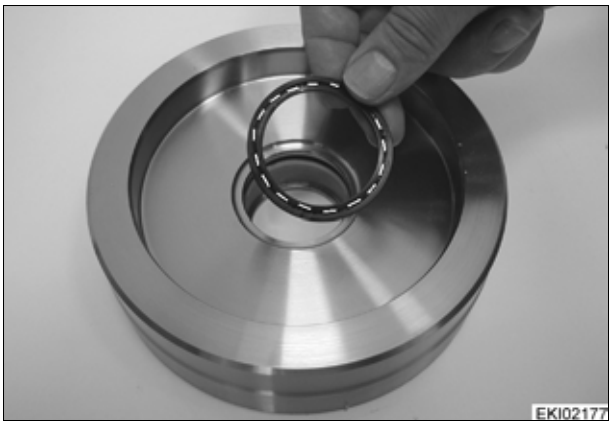

Fig. 17. I003654

Mount the pre-assembled piston (13).
Fit the ring (14).

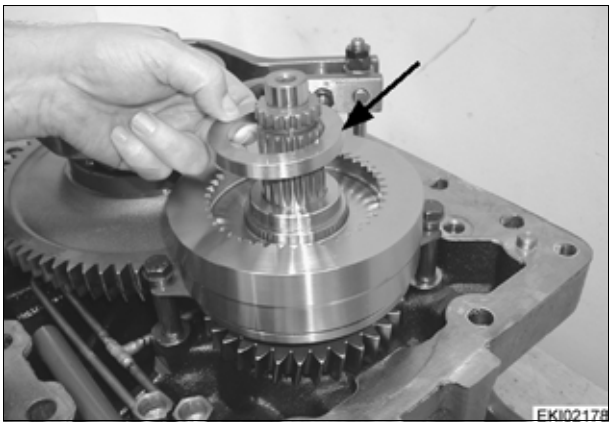

Fig. 18. I003655

Mount the five belleville springs (9) so that their larger diameters face each other.
Put the existing shim (8) in place.

NOTE: *The first belleville spring (9) is placed so that its larger diameter faces the ring (14)*
See also:
Technical drawing

If necessary, (e.g. shim (8) is misplaced or the internal toothed disc carrier (6) is replaced): Determine the preload of the belleville springs (9)

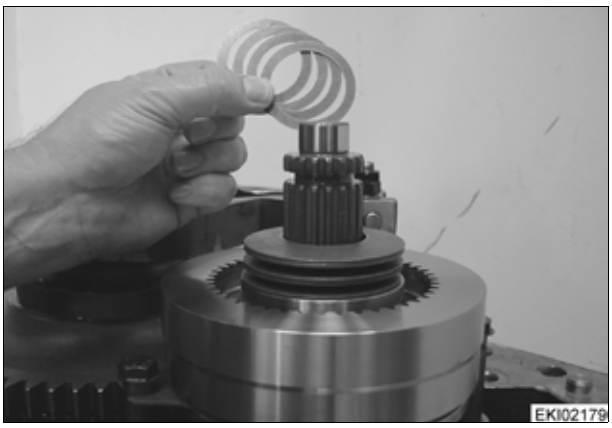

Fig. 19. I003656

Determine the preload of the belleville springs (9)

If it has been removed: Mount the locating ring (5) on the internal toothed disc carrier (6).
Coat the threads of the socket head cap screw (4) with X 903.050.084 synthetic bonding agent.
Tighten the socket head cap screws (4).

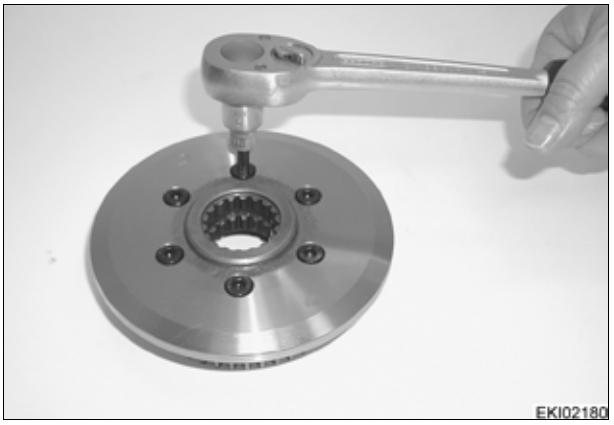

Fig. 20. I003657

Fit the pre-assembled internal toothed disc carrier (6).
Measure and note the distance between the front side of the shaft (35) and the internal toothed disc carrier (6).
E.g. 23.2 mm

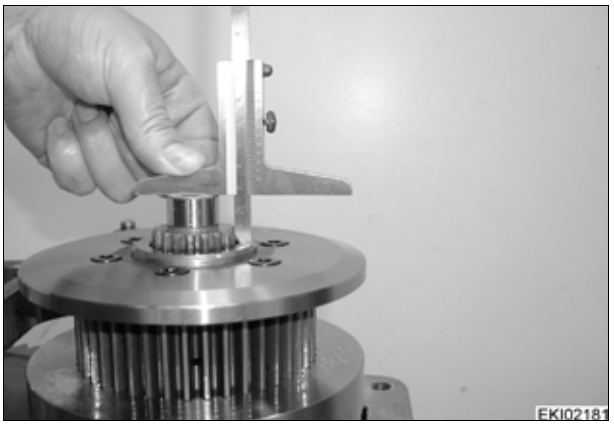

Fig. 21. I003658

Set up the X 899.980.145 jig and tighten the belleville springs (9).
Fit the ring halves (30).
In the case of ring halves (30) bevelled on one side, the bevel faces the internal toothed disc carrier (6)
Dismantle the X899.980.145 jig.

NOTE: *See also:*
Technical drawing

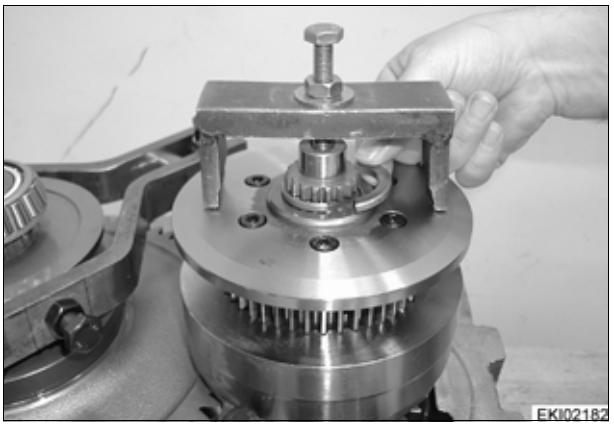

Fig. 22. I003659

Measure and note the distance between the front side of the shaft (35) and the internal toothed disc carrier (6).
E.g. 25.8 mm

If the belleville package (9) is pressed together by approx. 2.5 mm it will have the correct preload.

In the event of deviations, correct it using shims (8).

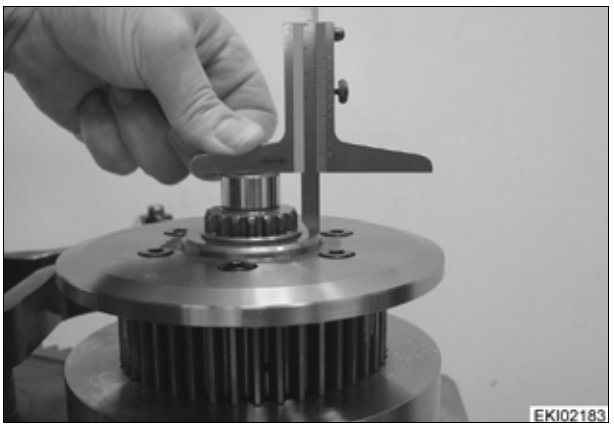

Fig. 23. I003660

Thread the disc package (10) on the internally toothed disc carrier (6).

Starting with an externally toothed disc (11), continue alternately with an internally toothed disc (12). In the process, the narrow groove (item 2) in **each** internally toothed disc (12) and the broad groove (item 3) in **every other** internally toothed disc (12) must be aligned.

Number of discs:
9 items of externally toothed disc (11)
8 items of internally toothed disc (12)

Rear axle HA 200
Number of discs

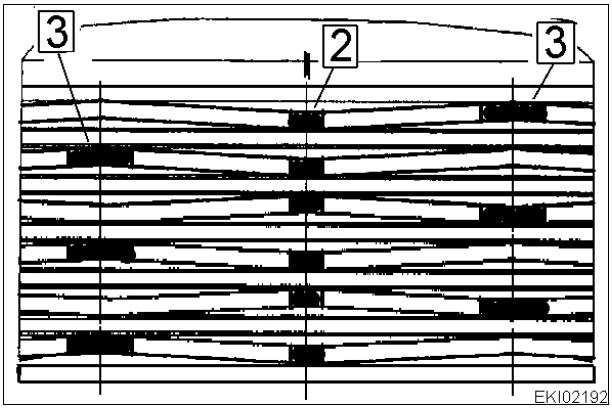

Fig. 24. I003661

Put the disc package (10) on the internally toothed disc carrier (6).

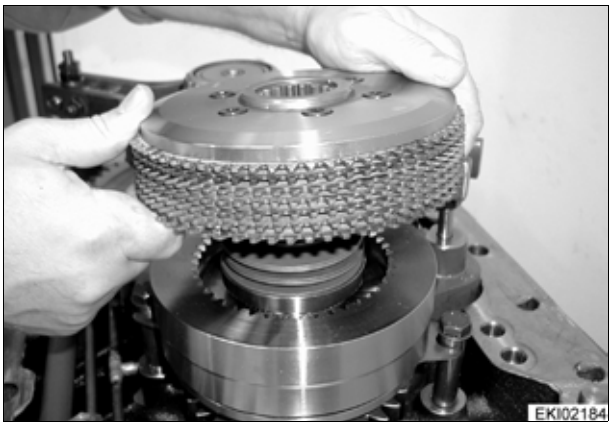

Fig. 25. I003662

Set up the X899.980.145 jig.
Tighten the clutch.
Fit the ring halves (30).
In the case of ring halves (30) bevelled on one side, the bevel faces the internal toothed disc carrier (6)

NOTE: *See also:*
Technical drawing

NOTE: *If the internally toothed disc carrier (6) does not latch, place the internally toothed disc carrier (6) without the disc package (10) and mark the teeth with a coloured pen.*

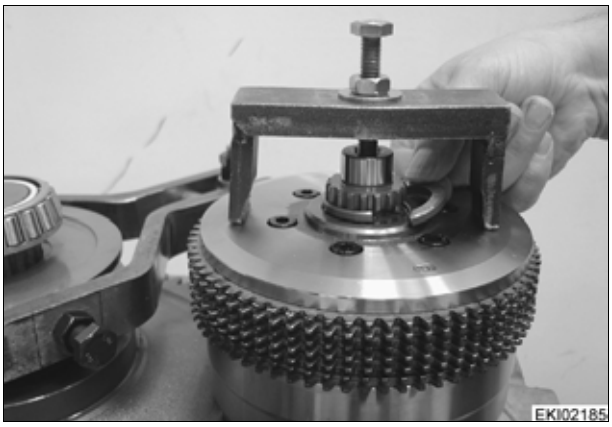

Fig. 26. I003668

Measure the air gap with a feeler gauge

Press in the disc package centrally.
Measure the air gap with a feeler gauge.
Target value: 1.60 mm ... 2.9 mm (air gap).

If the minimum air gap of 1.60 mm cannot be attained, the discs are screened.
Fit a new disc package (10)

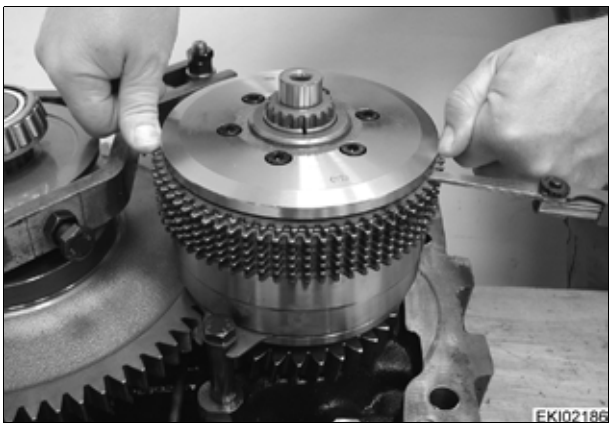

Fig. 27. I003669

Coat the thread of the nozzle (29) with X 903.050.084 synthetic bonding agent.
Tighten the nozzle (29) with a torque of **25 Nm** .

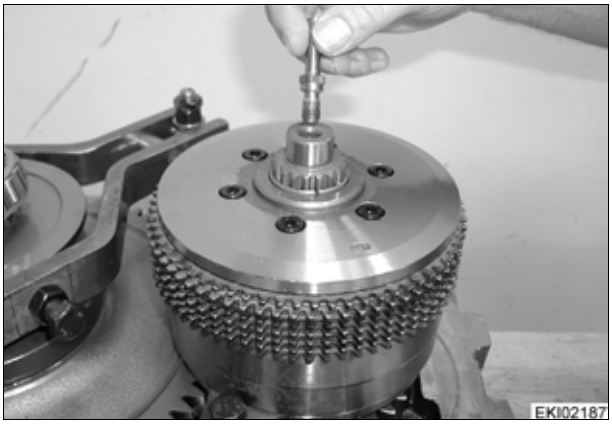

Fig. 28. I003670

If it has been removed:
Press the deep-groove ball bearing (28) with the closed side facing the top into the clutch bell housing (3) until it fits in place.

Fig. 29. I003671

If it has been removed:
Press on the deep-groove ball bearing (2) until it fits on the bell housing (3).

Fig. 30. I003672

Align the externally toothed discs (11) and press on the bell housing (3) until they fit in place

NOTE: *Do not bend the discs (11, 12) !*

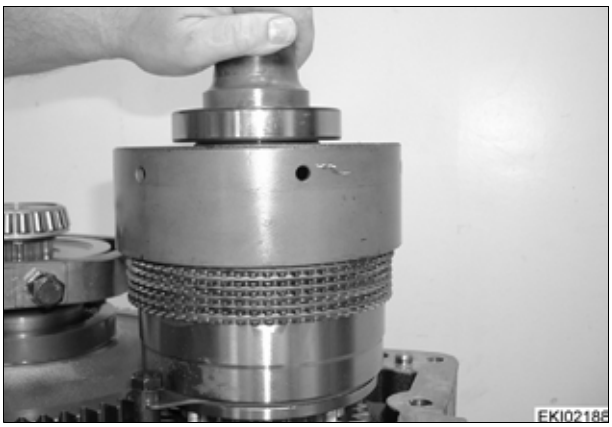

Fig. 31. I003673

Clean the flange surfaces.
Ensure that the two locating pins (arrowed) are fitted.
Coat flange surface with X 903.050.074 surface sealant.

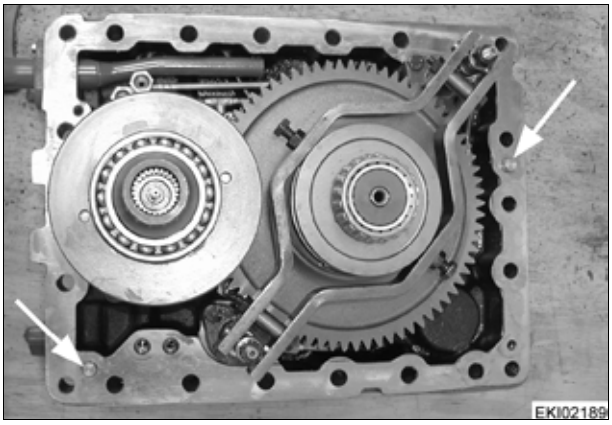

Fig. 32. I003675

Place the existing shims (1) in the upper bore.

NOTE: *Determining the shim (1)*
see §2

Fit and grease four new O-rings for the pressure connections (arrow).

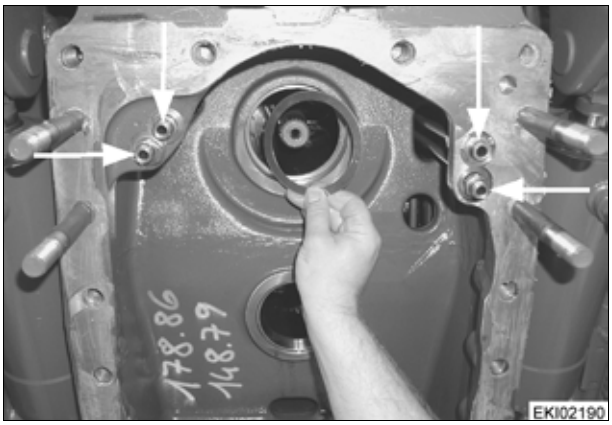

Fig. 33. I003676

Secure the housing cover in the hoist and fit the rear axle housing.

WARNING: Do not walk or stand under suspended loads!

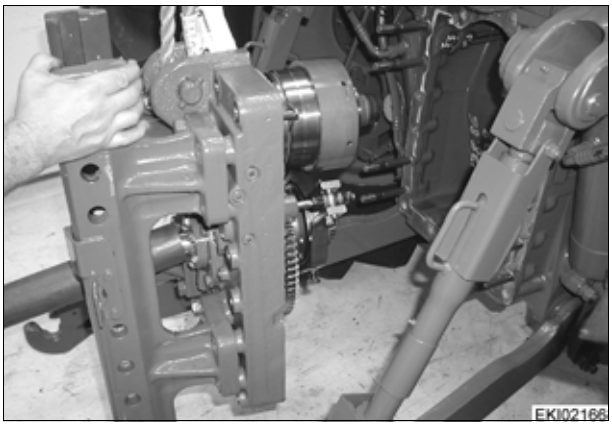

Fig. 34. I003643

- Tighten the fixing bolts and nuts M18 with **400 Nm** .
- Plug in the X169 separation point at the B020 rear PTO stub shaft sensor
- Plug in the X170 separation point at the B021 rear PTO clutch speed sensor
- Attach the compressed air couplings
- Attach the trailer hitch
- Replenish transmission oil

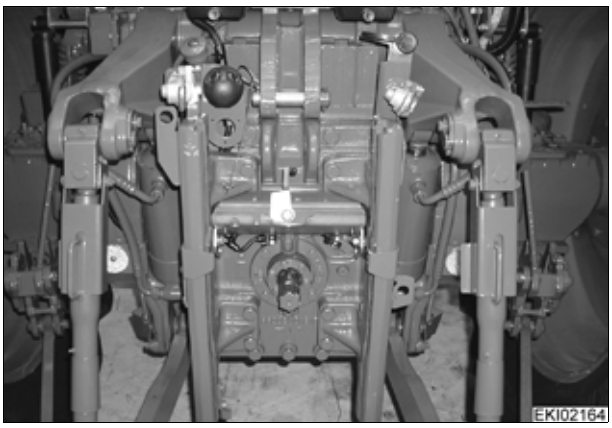

Fig. 35. I003641

2 Assembling and dismantling live PTO clutch and gears

PTO transmission

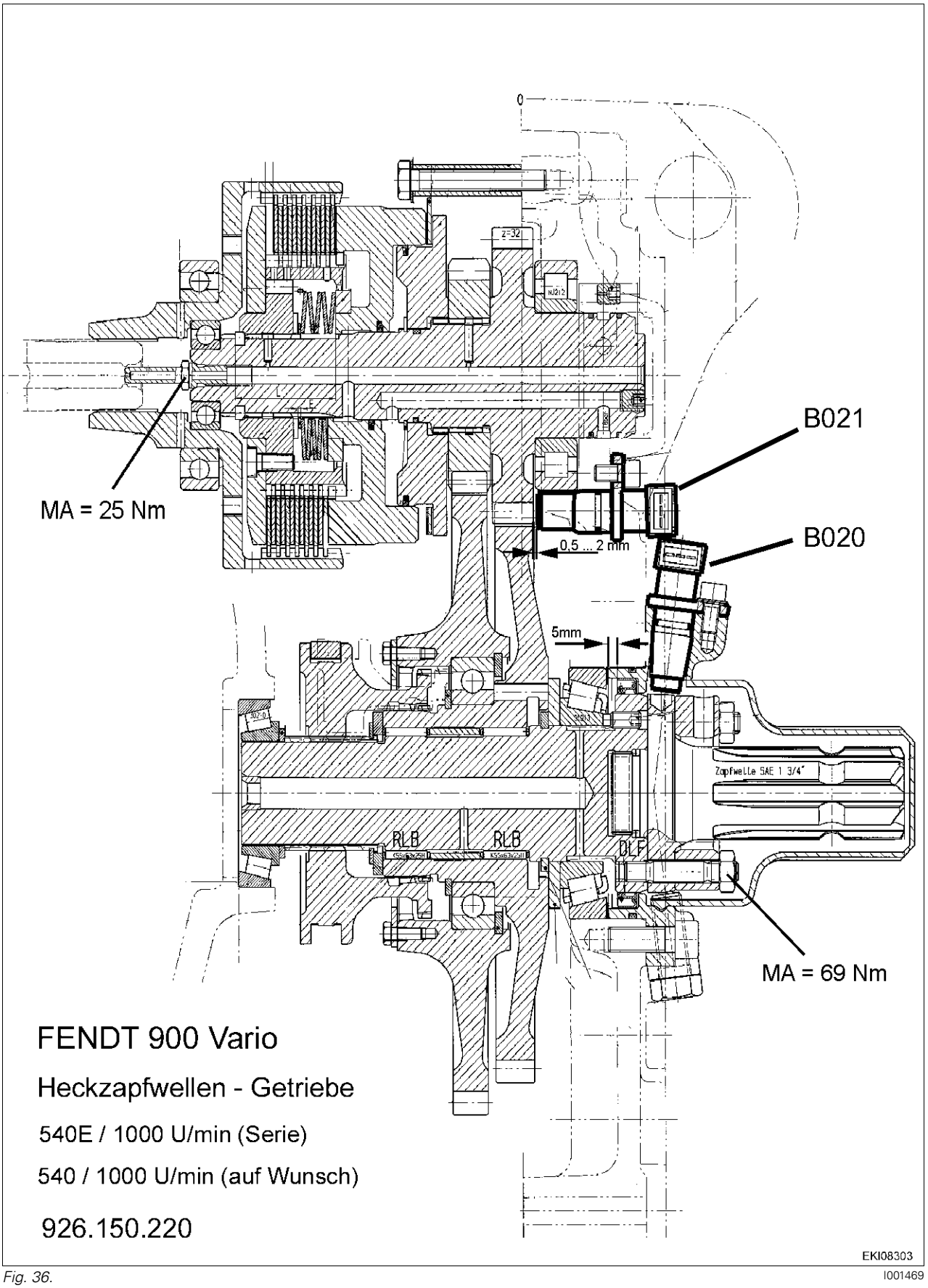

Fig. 36. I001469

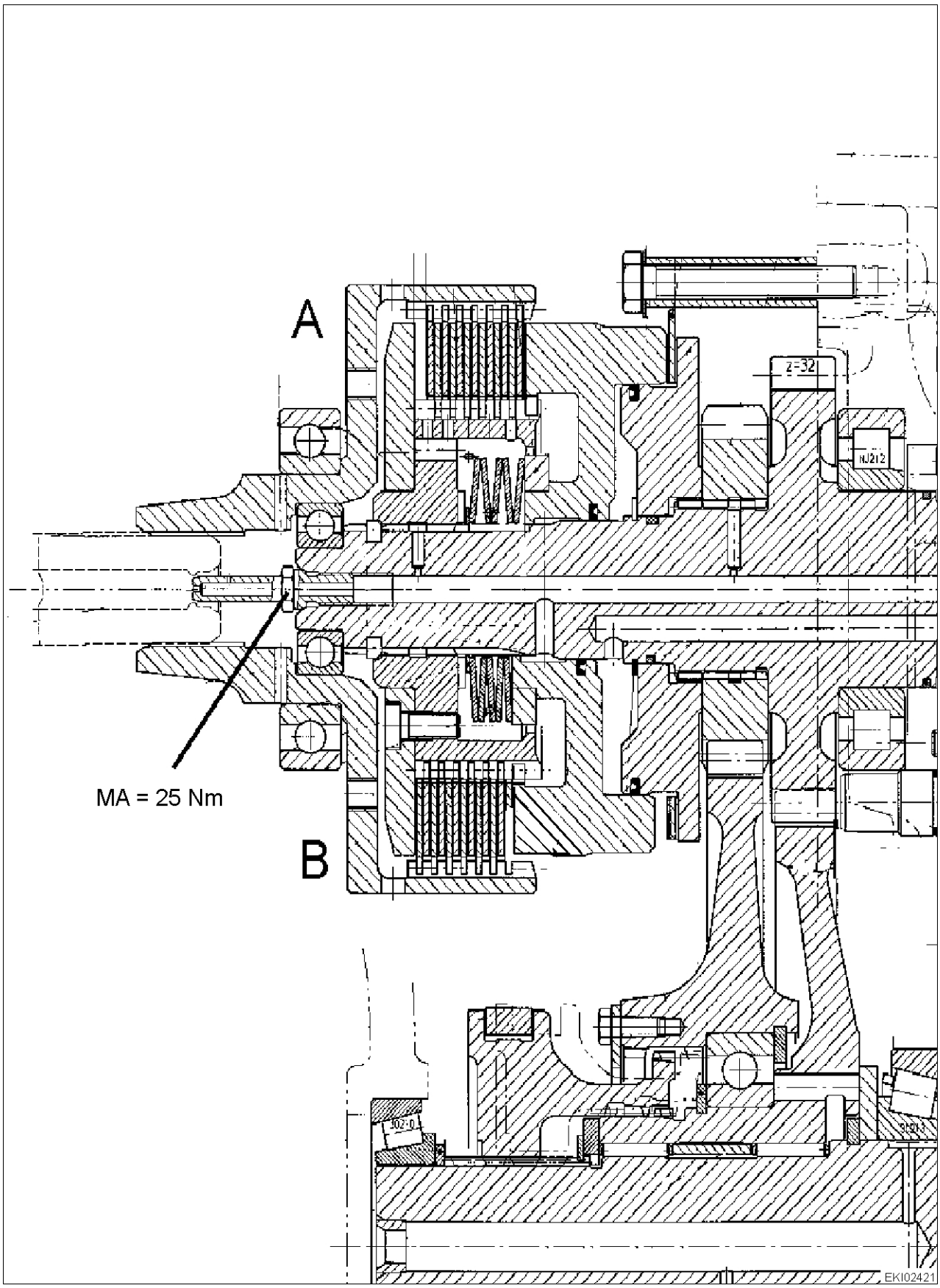

Fig. 37.

I003639

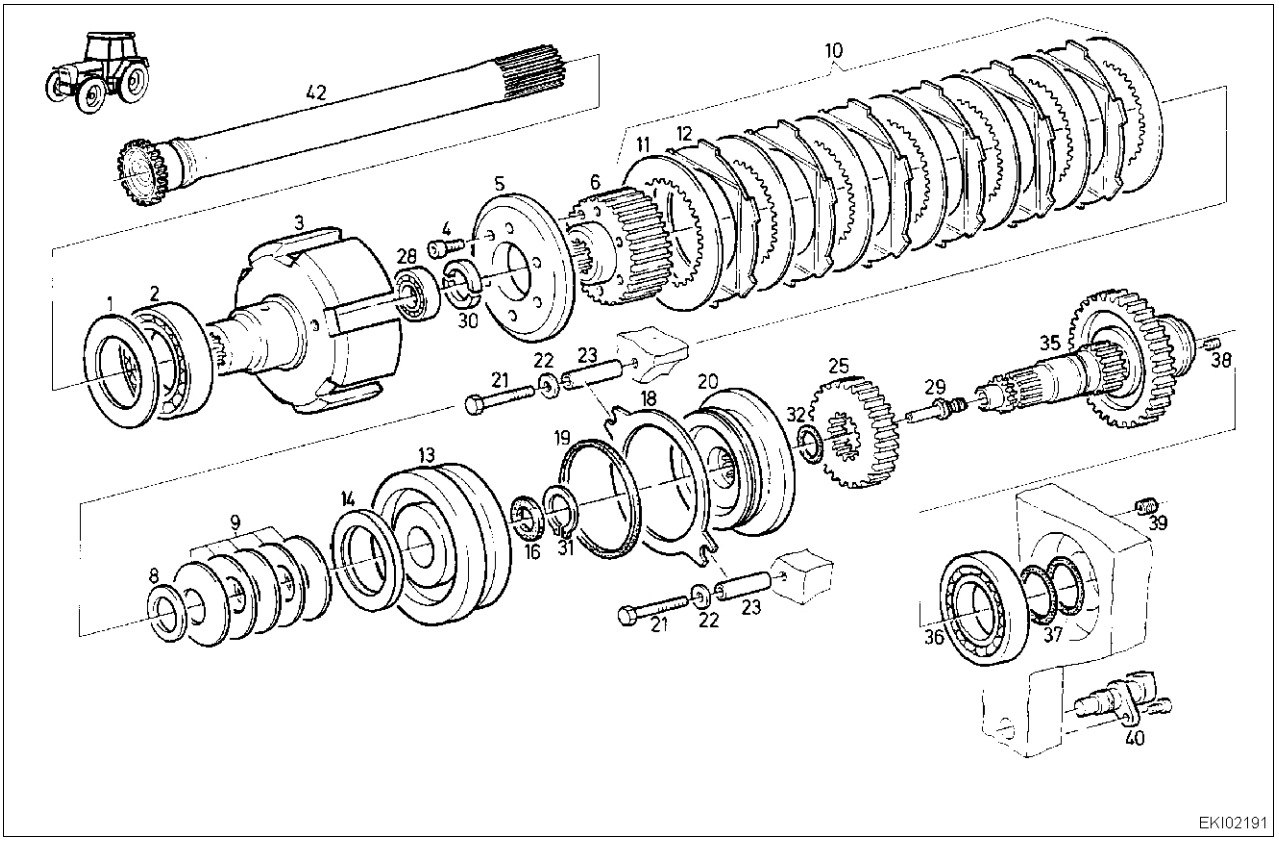

Fig. 38. I003640

Item	Designation	Item	Designation
1	Shim	21	Hex screw
2	Deep-groove ball bearing	22	Spring washer
3	Bell housing	23	Bush
4	Socket head cap screw	25	Spur gear
5	Locating ring	28	Deep-groove ball bearing
6	Internally toothed disc carrier	29	Nozzle
8	Shim	30	Half-ring
9	Belleville spring	31	Circlip
10	Disc package (11, 12)	32	O-ring
11	Externally toothed disc	35	Shaft
12	Internally toothed disc	36	Cylinder roller bearing
13	Piston	37	Rectangular-section ring
14	Ring	38	Setscrew
16	Lip seal	39	Nozzle
18	Disc	40	B021 rear PTO clutch speed sensor
19	Lip seal	42	Shaft
20	Brake disc		

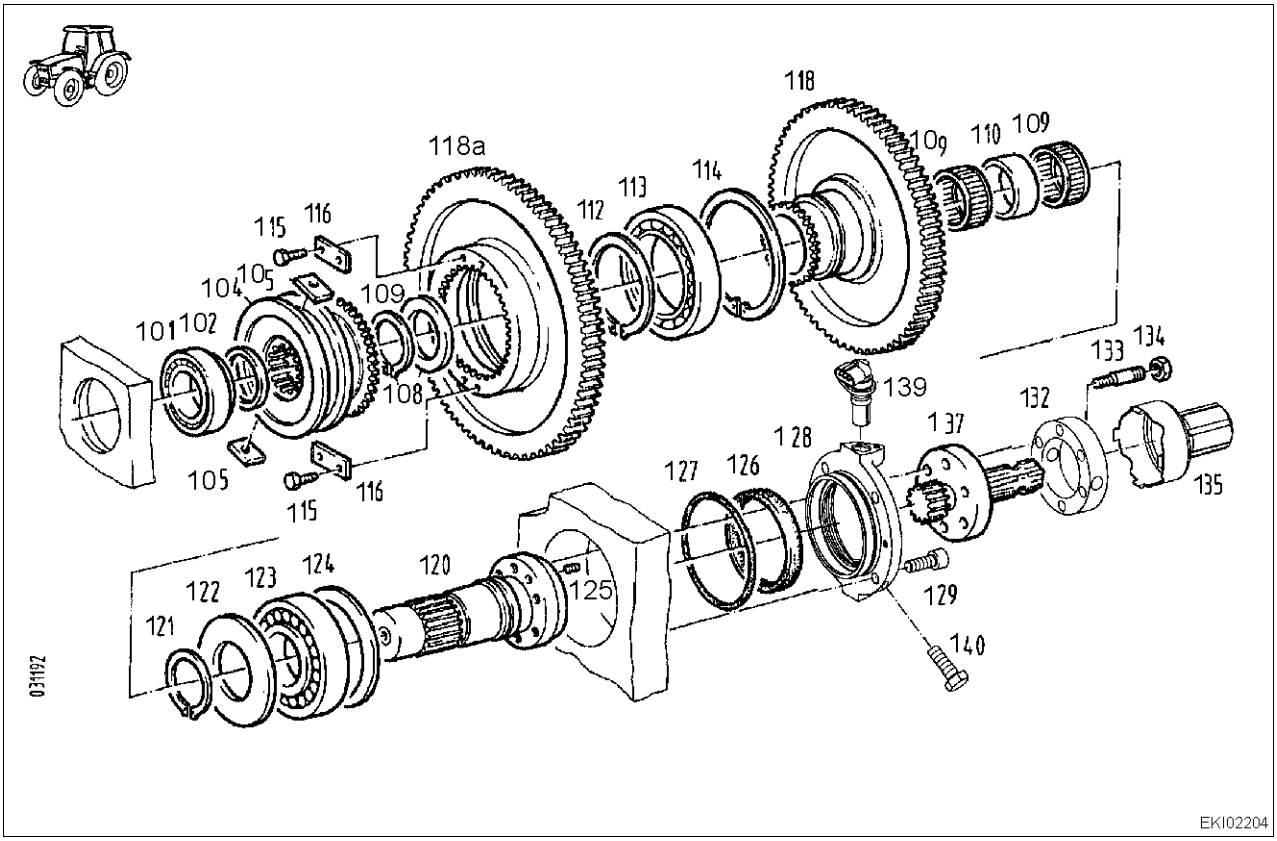

Fig. 39. I003681

Item	Designation	Item	Designation
101	Taper roller bearing	121	Circlip
102	Locating ring	122	Washer
104	Clutch body	123	Taper roller bearing
105	Slider	124	Shim
107	Circlip	125	Setscrew
108	Washer	126	Shaft seal ring
109	Needle bearing	127	O-ring
110	Spacer	128	Bearing cover
112	Circlip	129	Socket head cap screw
113	Deep-groove ball bearing	132	Spacer
114	Circlip	133	Stud bolt M10 x 50 - 10.9
115	Hex screw	134	Hex nut M10-10
116	Stop	135	PTO shaft guard
118	Spur gear (1000 rpm)	137	Flange pivot
118a	Spur gear (540 or 750 rpm)	139	B020 rear PTO stub shaft sensor
120	Shaft	140	Hex nut

PTO gear shift

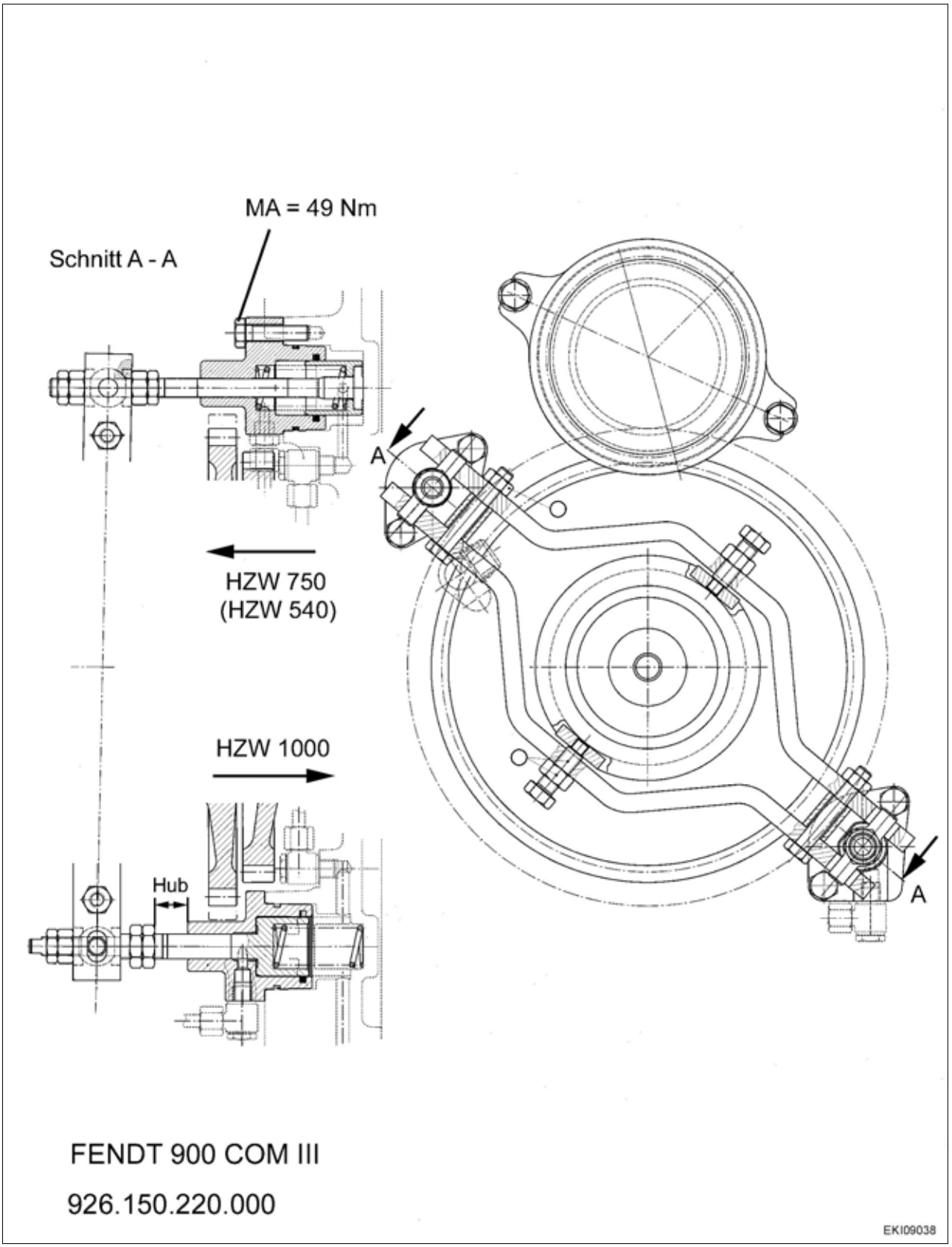

Fig. 40.

I003726

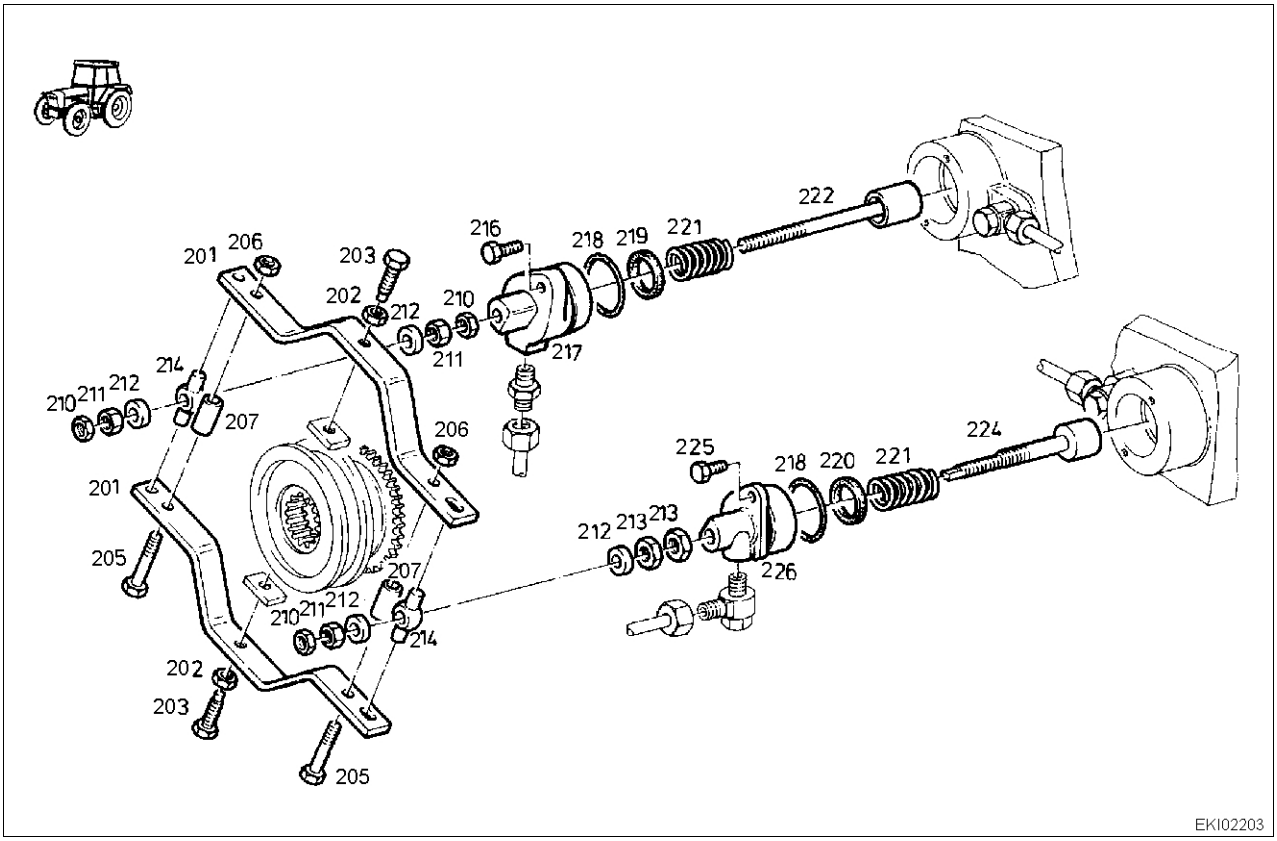

Fig. 41. I003682

Item	Designation	Item	Designation
201	Strap	216	Hex screw
202	Hex nut	217	Cylinder
203	Stud bolt	218	O-ring
205	Hex screw	219	Compact seal ring
206	Hex nut	220	Compact seal ring
207	Spacer sleeve	221	Pressure spring
210	Hex nut	222	Piston
211	Hex nut	224	Piston
212	Washer	225	Hex screw
213	Hex nut	226	Cylinder
214	Bearing jewel		

Dismantling PTO transmission and shift gears

Preliminary work:

- Lower the rear power lift
- Drain transmission oil (approx. 67 l)
- Remove the trailer hitch
- Mark and unplug the X169 separation point at the B020 rear PTO stub shaft sensor
- Mark and unplug the X170 separation point at the B021 rear PTO clutch speed sensor
- Unscrew the compressed air couplings

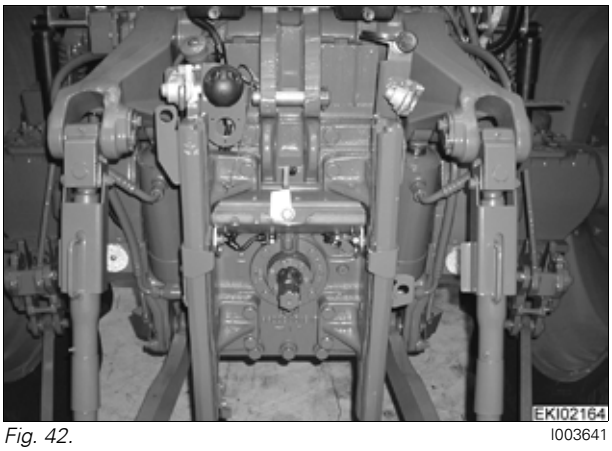

Fig. 42. I003641

Unscrew all fixing bolts and nuts.
Remove the plugs from the threaded bores and screw in two jack screws M12 (arrows).
Secure the housing cover in the hoist and release the housing cover.

WARNING: Do not walk or stand under suspended loads!

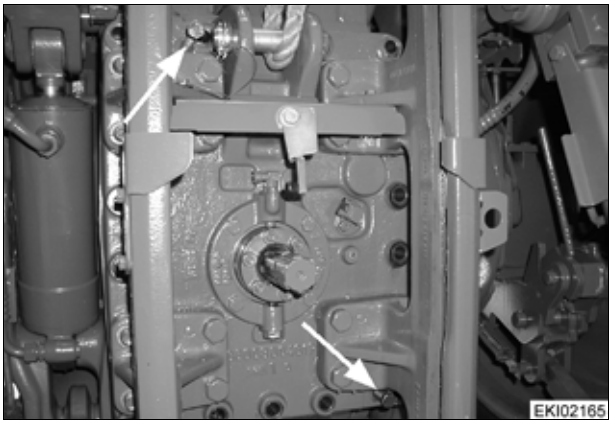

Fig. 43. I003642

Remove the housing cover (with rear PTO).

NOTE: *Take note of the shim (1).*
The washer (1) is used to adjust the bearing play

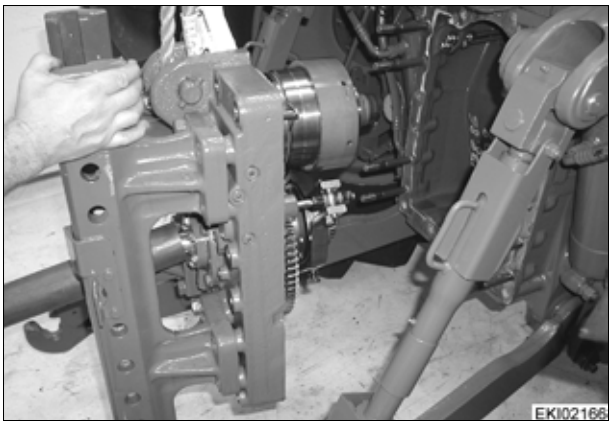

Fig. 44. I003643

Dismantle the live PTO clutch

NOTE: *See also:*
Chapter 1220; Register G – Assembling and dismantling live PTO clutch

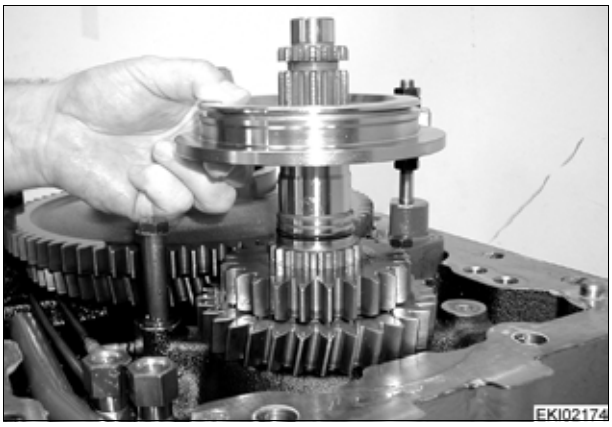

Fig. 45. I003651

Dismantling the PTO transmission

Pull out the tapered roller bearing (101) with a standard extraction tool.
Remove the locating ring.

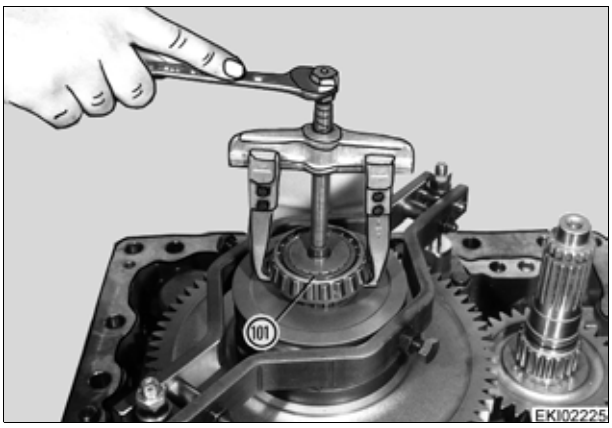

Fig. 46. I003683

If required, note the adjustment value of the hex nut (210 and 211).
Unscrew the hex nuts (210 and 211).
Remove the stops (116).
Dismantle the shift gear.

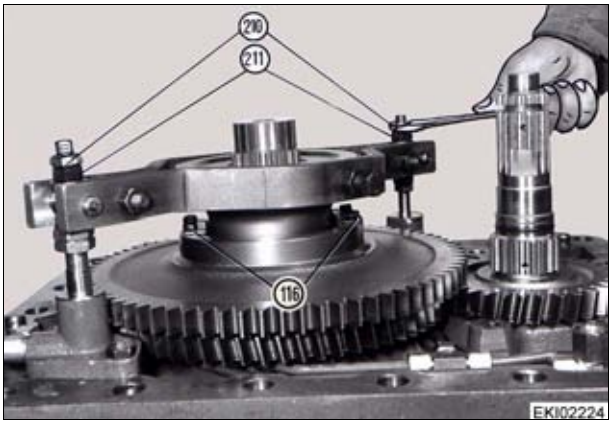

Fig. 47. I003684

Remove the spur gears (118) and (118a).

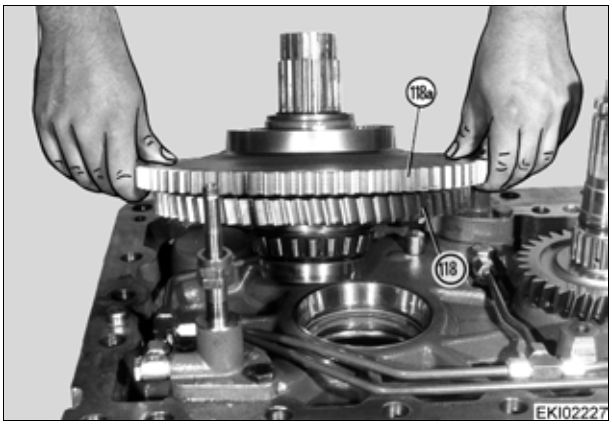

Fig. 48. I003685

Remove the shaft (35).
If required, push out the outer bearing rings.

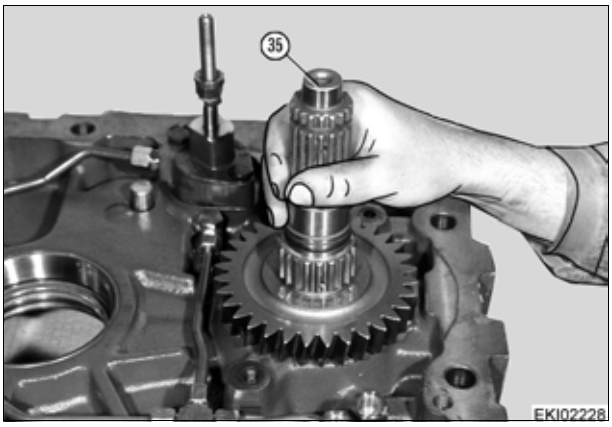

Fig. 49. I003686

If required, dismantle the cylinder (217) and/or cylinder (226).

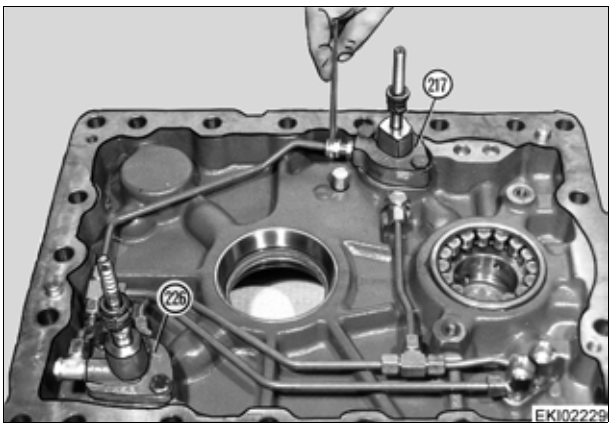

Fig. 50. I003687

Snap out the circlip (107).
Remove the washer (108) and the spur gears

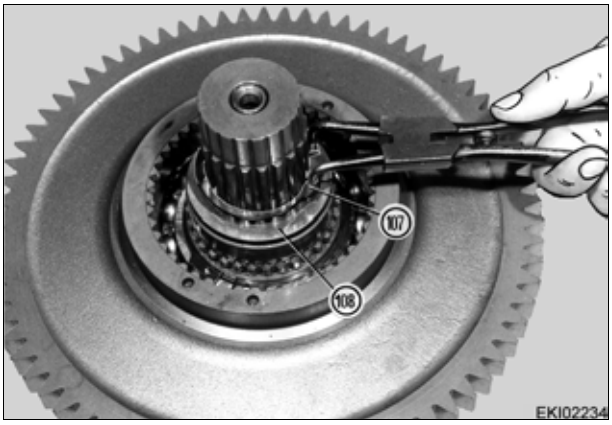

Fig. 51. I003688

Snap out the circlip (112).
Press out the spur gear (118).

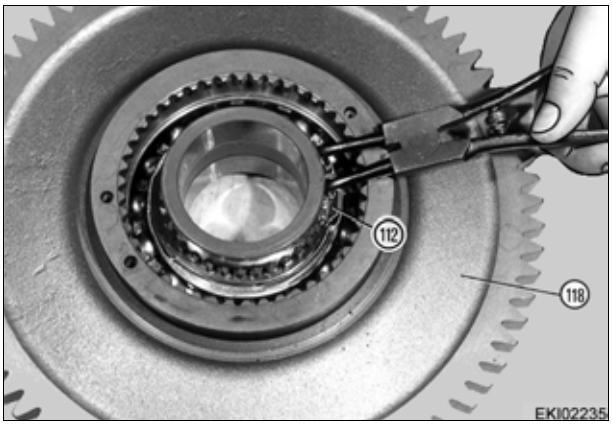

Fig. 52. I003689

Assembling PTO transmission and shift gears

Assemble the PTO transmission

Press the deep-groove ball bearing (113) until it fits into the spur gear (118a).
Put the circlip (114) in place.
Thereafter, press the spur gear (118) until it falls in place

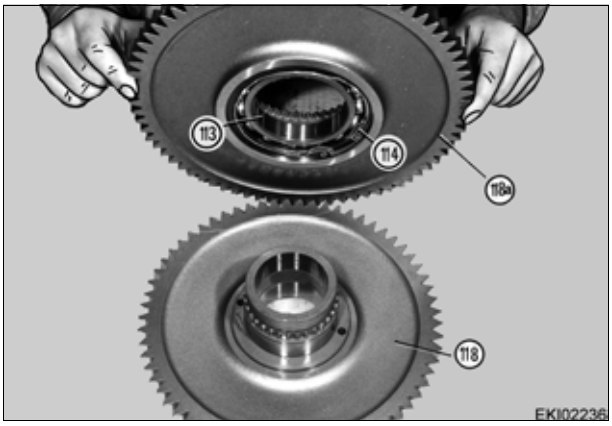

Fig. 53. I003690

Put the circlip (112) in place on the opposite side.

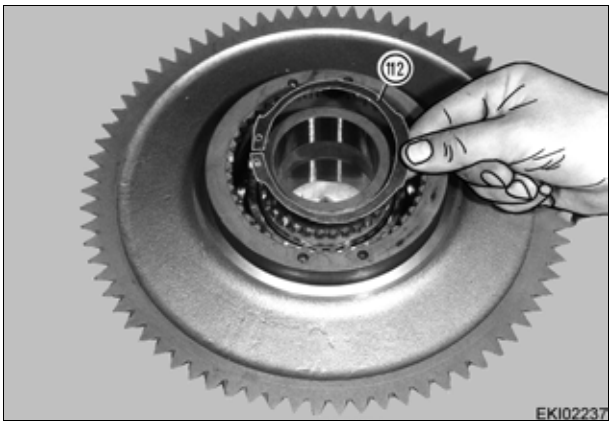

Fig. 54. I003691

Press the inner ring of the tapered roller bearing (123) on to the shaft (120).
Fit the washer (120).
Put the circlip (121) in place.
Grease two setscrews (125) with X 903.050.084 synthetic bonding agent and turn them until they reach the inner ring of the tapered roller bearing (123).
Washer (122) must become tight.

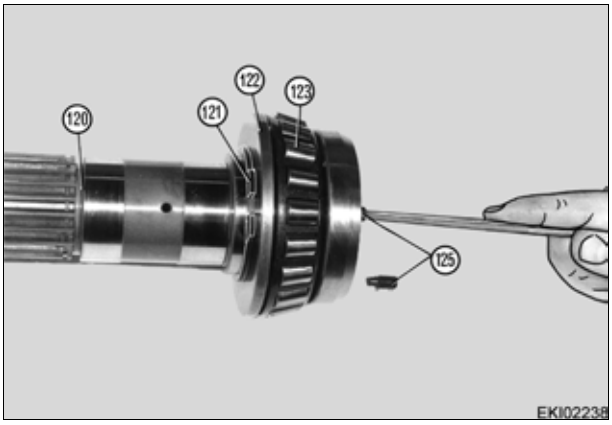

Fig. 55. I003692

Thread the needle bearing (109), spacer (110) and needle bearing (109) onto the shaft (120).
Insert the shaft (120).
Fit the washer (108).
Put the circlip (107) in place.

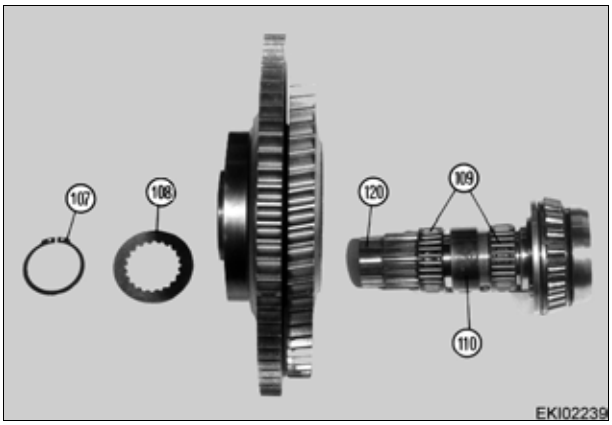

Fig. 56. I003693

Place the new compact seal rings (219) in the cylinder (217).
Place the new O-ring (218) in the groove of the cylinder (217).
Grease the sealing elements.
Insert the piston (222) with the pressure spring (221) in the manner shown in the cylinder (217).

NOTE: *The compact seal ring (219) consists of two parts, O-ring on the outside and a piston guide tape inside.*

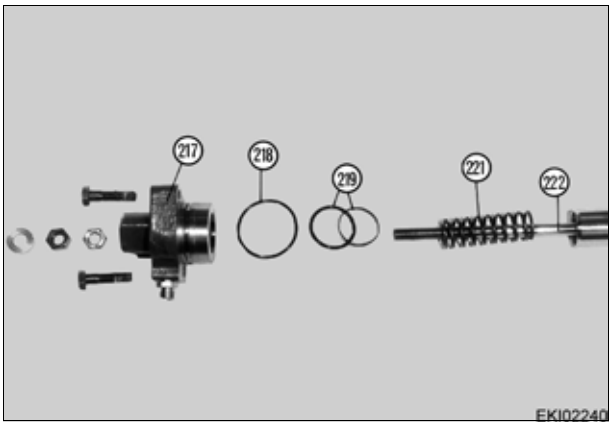

Fig. 57. I003694

Place the new compact seal rings (220) in the cylinder (226).
Place the new O-ring (218) in the groove of the cylinder (226).
Grease the sealing elements.
Insert the piston (224) with the pressure spring (221) in the manner shown in the cylinder (226).

NOTE: *The compact seal ring (220) consists of two parts, O-ring on the outside and a piston guide tape inside.*

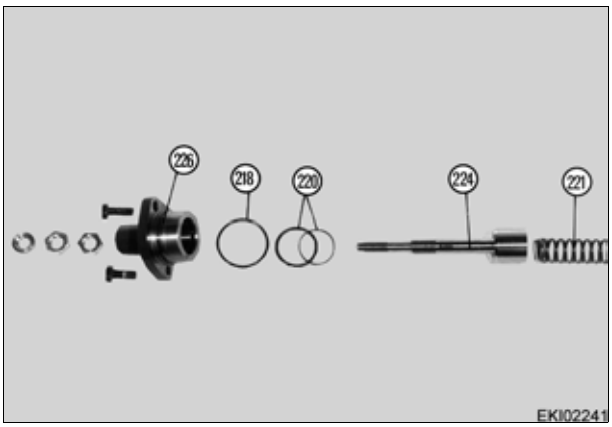

Fig. 58. I003695

Fit cylinder (217) and cylinder (226).
Coat the threads of the hex screw (216) and (225) with X903.050.084 synthetic bonding agent and tighten them with a torque of **49 Nm** .
Fit the hydraulic lines that have been dismantled in the housing cover (316).

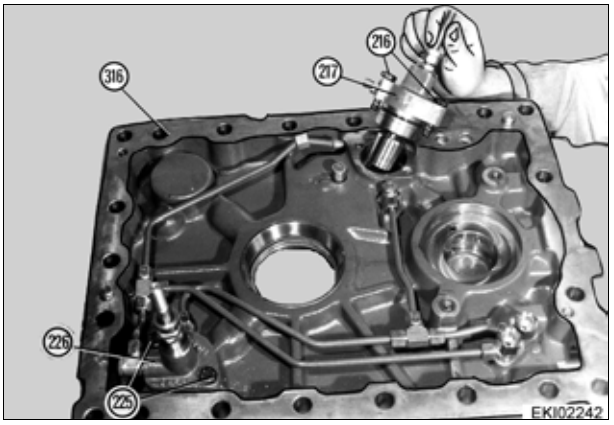

Fig. 59. I003696

If a new housing cover (316) is being fitted, turn the nozzle (29) in the threaded bore until it is in place.
Press the outer bearing rings of the cylinder roller bearing (36) in until they are in place.

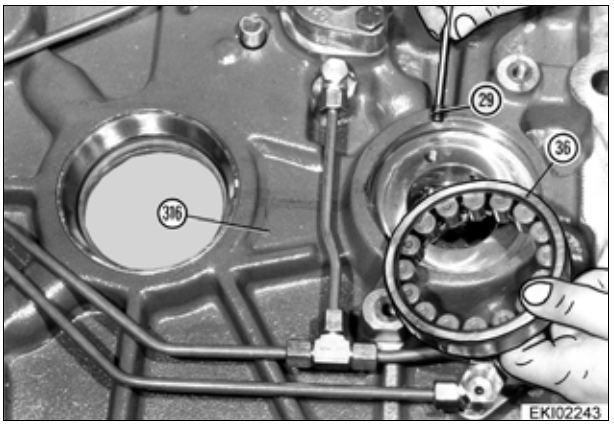

Fig. 60. I003697

Insert, lock and grease two new rectangular-section rings (37) in the grooves of the shaft (35).
Press the inner bearing rings of the cylinder roller bearing (36) until they are in place.
When fitting a new shaft (35), coat the setscrews (38) with X903.050.084 synthetic bonding agent and turn them until they are in place.
Screw in the nozzle (29) until it is in place.

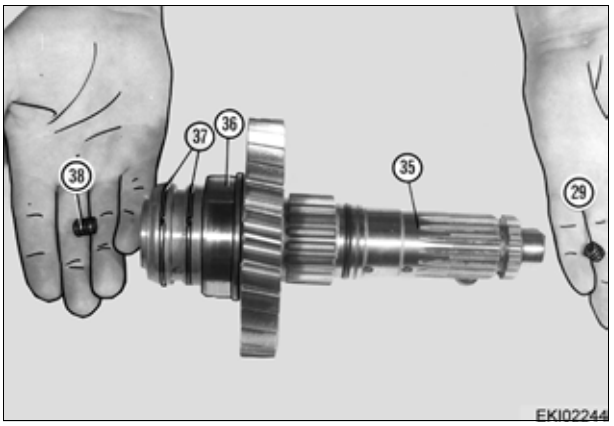

Fig. 61. I003698

Place the pre-assembled shaft (35) in the housing cover (316).

Where removed:
Fit the existing shims (124) and press the outer bearing ring of the tapered roller bearing (123) until it is in place.

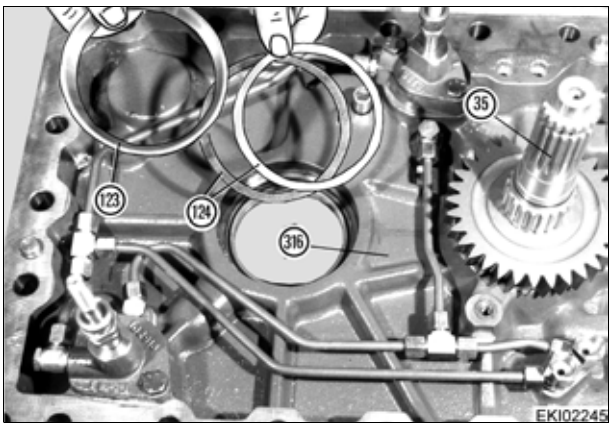

Fig. 62. I003699

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-

Insert the pre-assembled pair of wheels and spur gear (25).

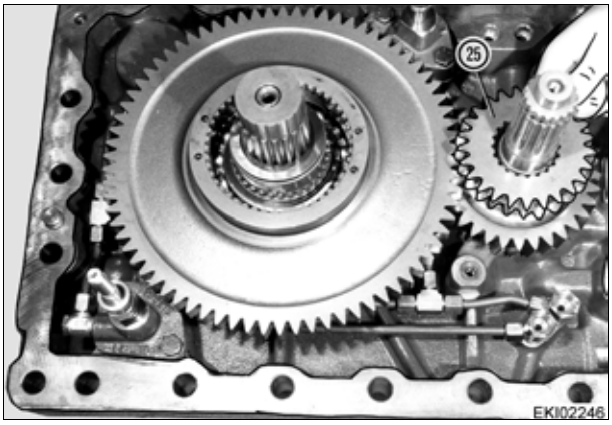

Fig. 63. I003700

Fit the pre-assembled strap (201)

Coat the threads of the hex screw (205) with X903.050.084 synthetic bonding agent.
Fit the spacers (207) and bearing jewels (214).
Tighten the hex nuts (206).

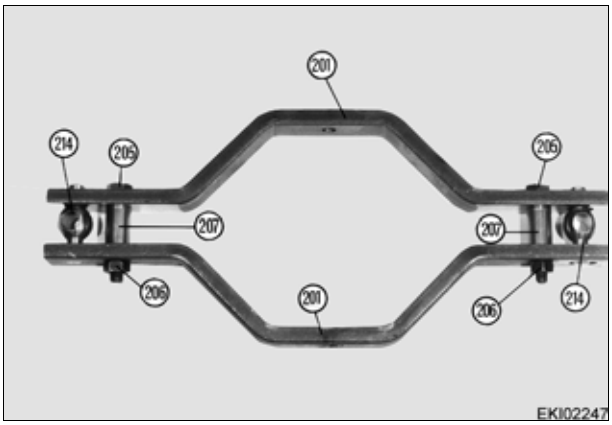

Fig. 64. I003701

Insert the sliders (105) in the clutch body (104).
Coat the stud bolt threads (203) with synthetic bonding agent X903.050.084.
Adjust the strap (201) so that it is equidistant and has no play.
Subsequently, turn each stud bolt (203) back by about **1/6 revolution** and lock it in this position.

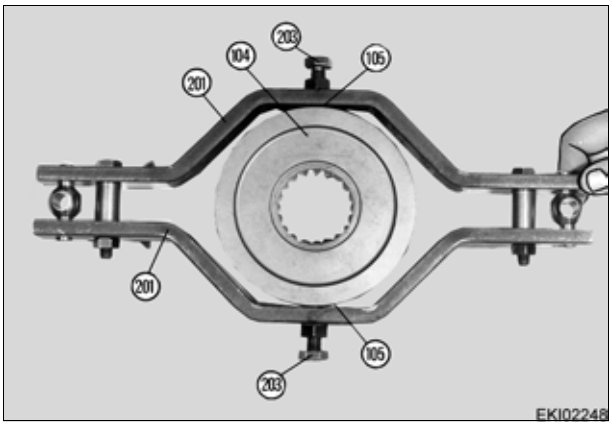

Fig. 65. I003702

Screw the hex nuts (210), (211) and (213) onto the piston rods (222) and (224).
Place the washers (212) with the depression facing upwards.

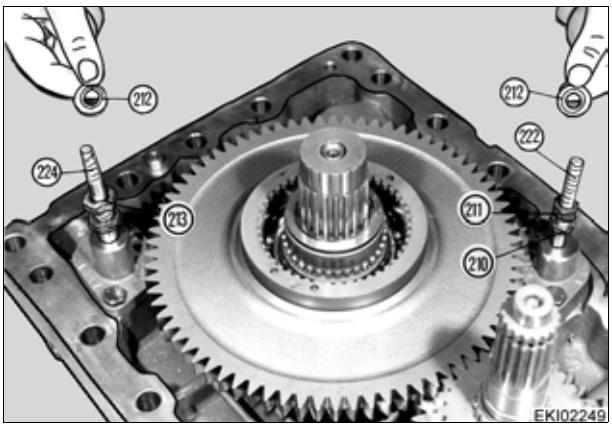

Fig. 66. I003703

Insert the pre-assembled strap (201).
Place the washer (212) with the depression facing downwards.
Fit the hex nuts (211) and (210).

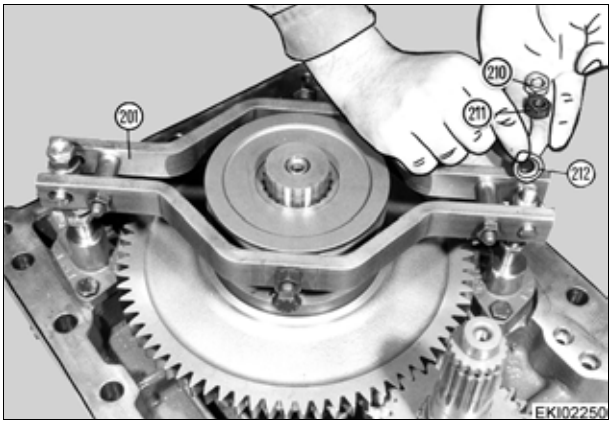

Fig. 67. I003704

Coat the threads of the hex screw (115) with X903.050.084 synthetic bonding agent.
Place the stops (116) and tighten the hex screws (115).

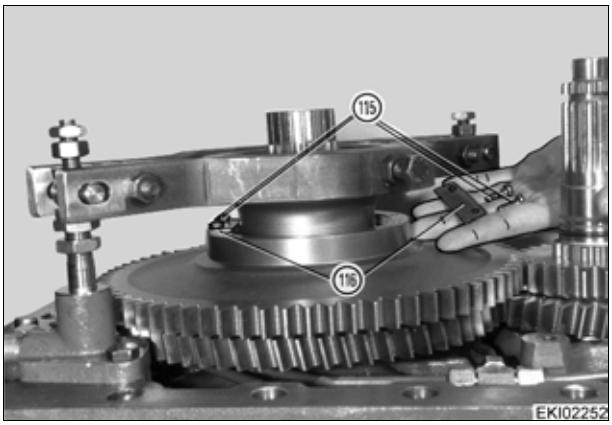

Fig. 68. I003705

Prior to adjusting the travel, please ensure that:

The slot in the strap (201) is facing the cylinder (226).
Screw the hex nut (213) completely onto the piston rod of the cylinder (226).
Screw on the hex nuts (211) and (210) until they are in place and lock them.

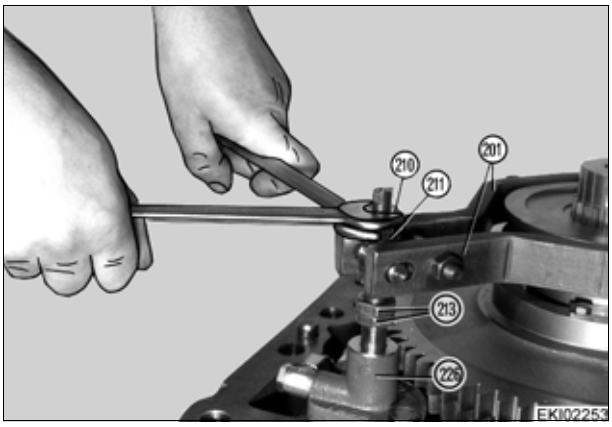

Fig. 69. I003706

Adjust the shift to 750 rpm or 540 rpm

Screw the ring nut M12 (self-made) onto the piston rod of the cylinder (217).
Pull out the piston rod with the help of the hoist until it reaches the stop position. (Shift position 750 or 540 rpm)
Check the play of the clutch body (104).
Target value: 0.1 mm ... 0.2 mm (play)

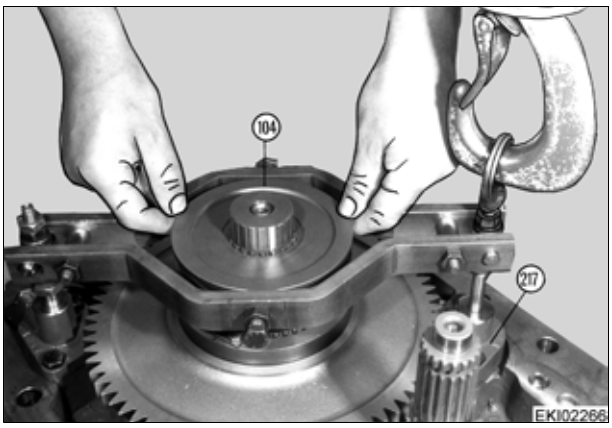

Fig. 70. I003707

In case of deviations:
Change the adjusting nuts M12 above and below until the play is 0.1 mm ... 0.2 mm .

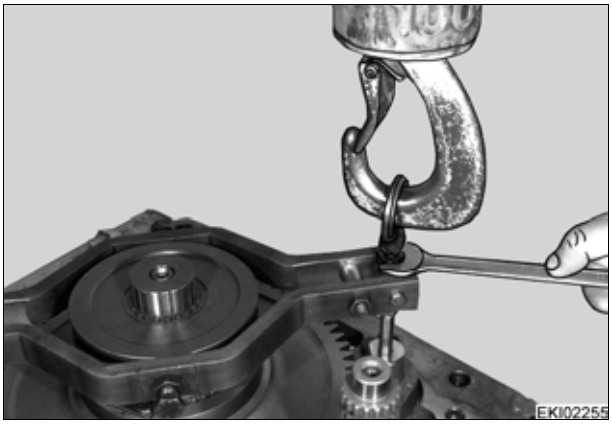

Fig. 71. I003708

Remove the hoist.
Unscrew the ring nut M12 (self-made).
Tighten the hex nuts.

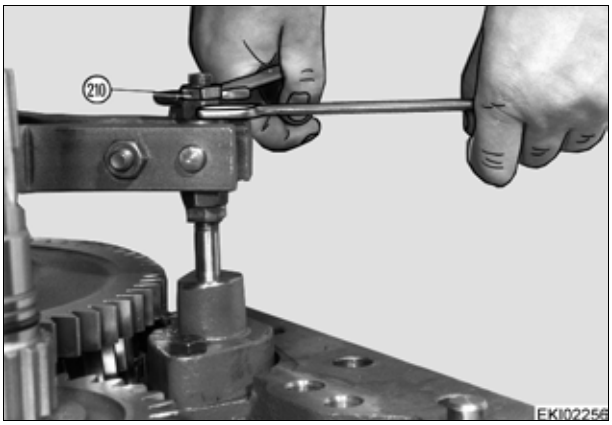

Fig. 72. I003709

Set the shift to 1000 rpm

Press in the piston rod of the cylinder (226) using a vice until the hex nuts (213) are in place. (Stroke limit, switch position 1000 rpm)

Check the play of the clutch body (104).

Target value: 0.1 mm ... 0.2 mm (play)

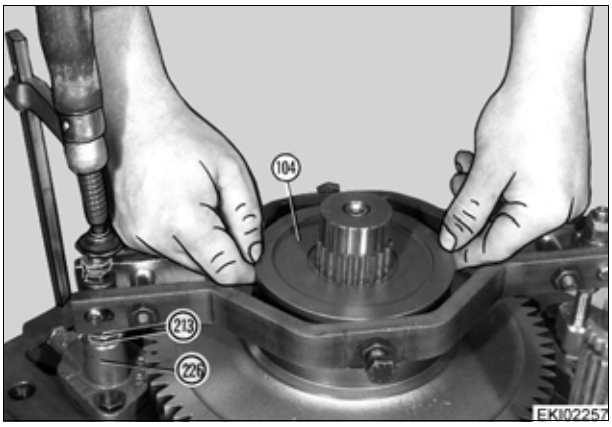

Fig. 73. I003710

In case of deviations:
Change the hex nuts (213) and lock them until the play is 0.1 mm ... 0.2 mm .

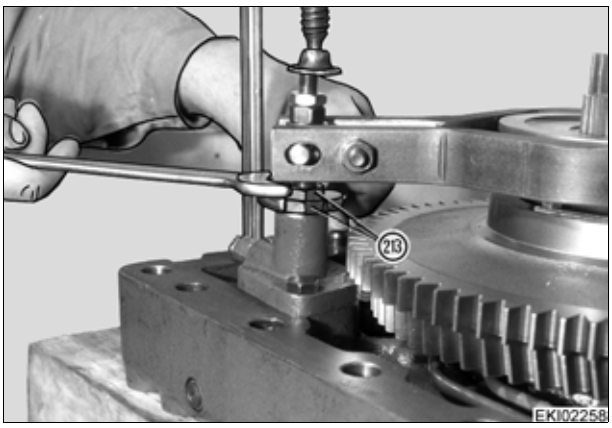

Fig. 74. I003711

Remove the vice.
The shift gear latches in the "Neutral" position
The spur gears of the gear position 750 or 540 and 1000 must be free to turn.
The free travel of the shift gear must be the same in both the up and down directions.
If this is not the case repeat the adjustment.

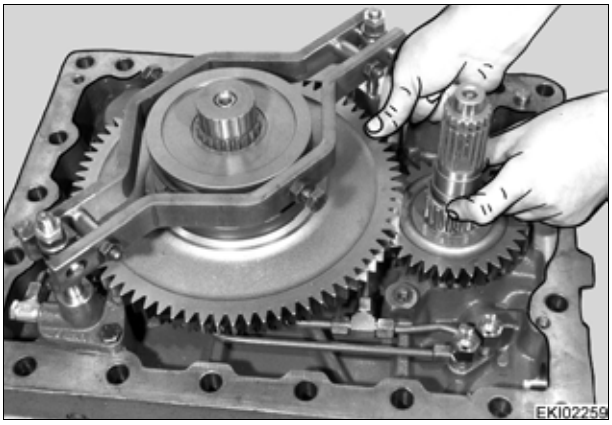

Fig. 75. I003712

Fit the location ring (102).
Press the inner ring of the tapered roller bearing (101) until it fits into place on the shaft (120).

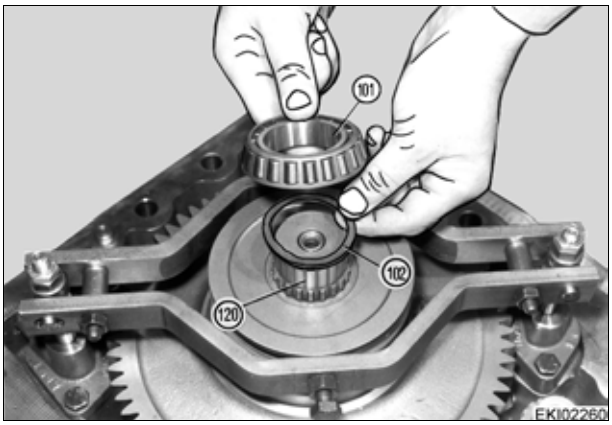

Fig. 76. I003713

Fit the spur gear (25).
Place the new O-ring in the groove of the shaft (35) and grease it.
Check the brake disc (20) for damage.
If necessary, fit a new brake disc (20).
For details regarding clutch assembly, please see: Chapter 1220; Register G – Assembling and dismantling live PTO clutch

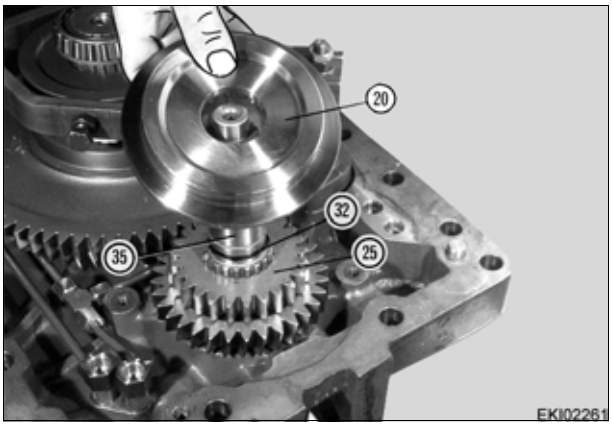

Fig. 77. I003714

Align the externally toothed discs (12) and press on the bell housing (3) until they fit in place.

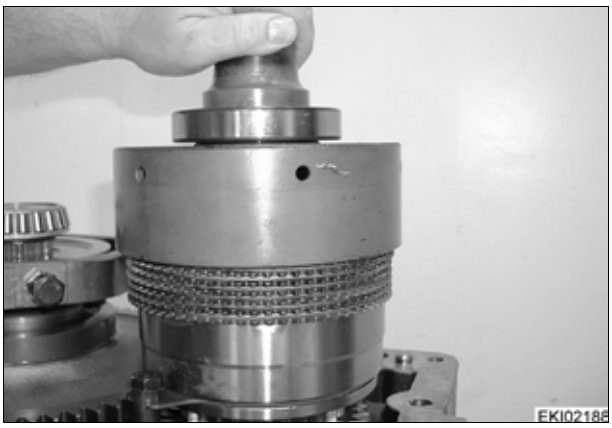

Fig. 78. I003673

Adjust the play on the bearing of the bell housing (3)

Fit the existing shim (1) or the shim (1) on the deep-groove ball bearing (2).
Measure and record the distance to the flange surface.
E.g. 178.6 mm

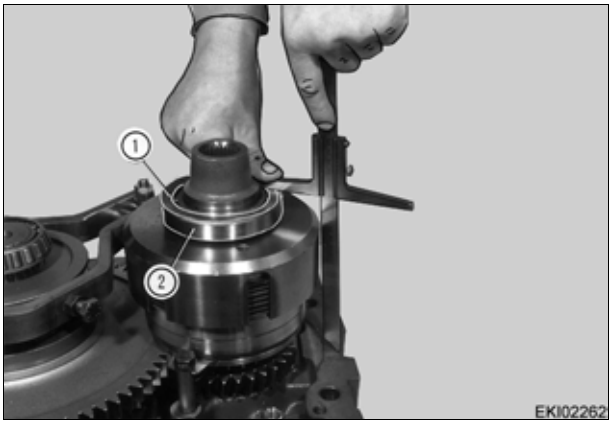

Fig. 79. I003727

The size of the bearing contact surface with the flange surface is indicated in white colour at the top of the rear axle housing.
E.g. 178.71
The size of the deep-groove ball bearing (2) washer to the flange surface of the housing cover must be smaller by 0.1 mm ... 0.2 mm than the size indicated.
This means that the bearing must have a play of 0.1 mm ... 0.2 mm .
In the event of deviations, correct it using a shim (1).

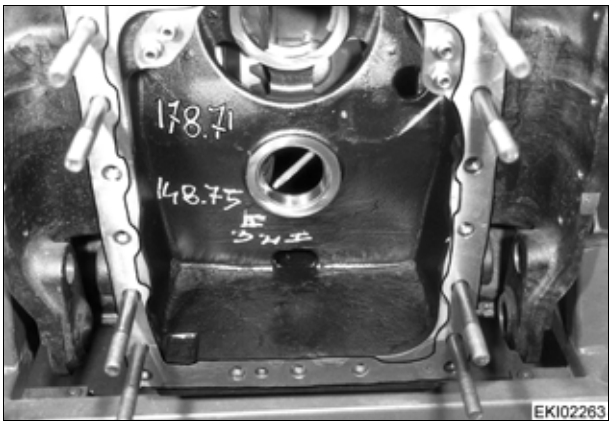

Fig. 80. I003716

The size of the lower shaft from the bearing entry flange to the flange surface is given in white colour below in the rear axle housing,
e.g. 148.75.

NOTE: *This dimension is not required for repair, since a gauge is required to measure the play in the bearing. Check the play in the bearing of the lower shaft (120): Please refer to the detailed description*

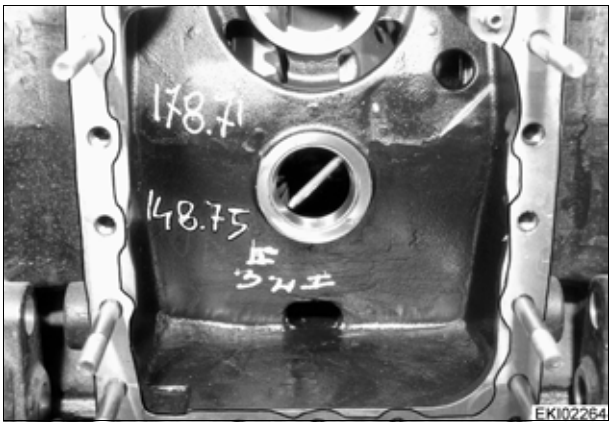

Fig. 81. I003717

Place the shims (1) in the upper bore.
Fit and grease four new O-rings for the pressure connections.

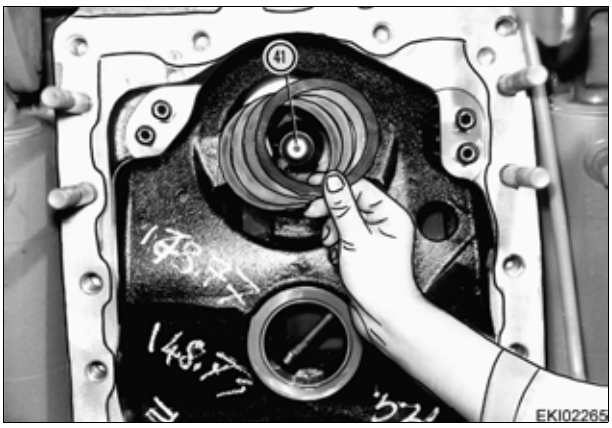

Fig. 82. I003718

Secure the housing cover in the hoist and fit the rear axle housing.

WARNING: Do not walk or stand under suspended loads!

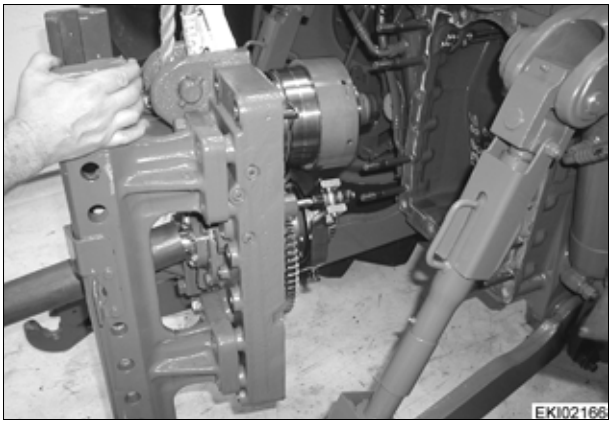

Fig. 83. I003643

Tighten the fixing bolts and nuts M18 with 400 Nm .

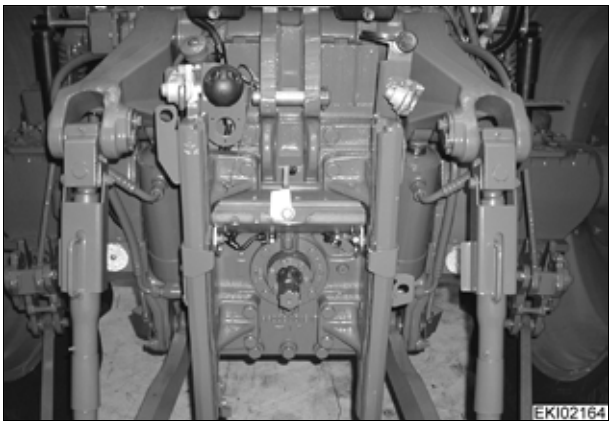

Fig. 84. I003641

Where removed:
Coat the new shaft seal ring (126) externally with a thin layer of X903.051.711 sealing agent - with the lip seal facing the oil chamber - press it into the bearing cover (128) until it is in place.
(offset approx. 5 mm)

Fill sealing lips 2/3 with grease.

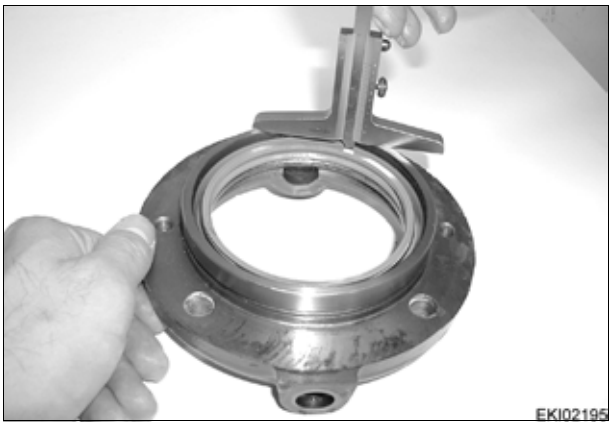

Fig. 85. I003719

Adjust the play of the shaft (120)

Put the existing shims (124) in place.
Place the new O-ring (127) in the notch of the bearing cover (128) and grease it.
Coat the threads of the hex screws (129) with X 903.050.084 synthetic bonding agent and tighten them.

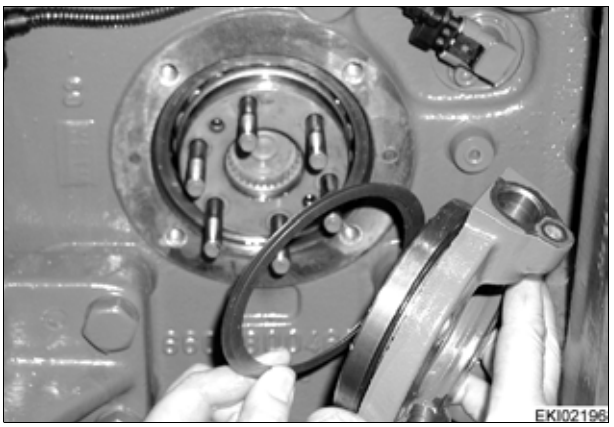

Fig. 86. I003720

Turn the shaft (120) approx. 10 times.
Attach gauge.
Press in the shaft (120) once and observe the play.

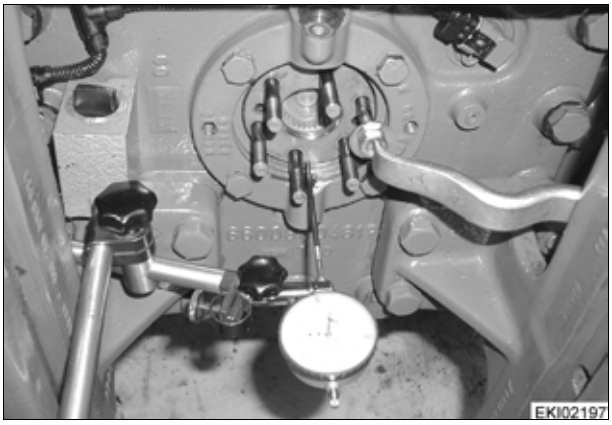

Fig. 87. I003721

Turn the shaft (120) approx. 10 times.
Attach gauge.
Pull back the shaft (120) once and observe the play.
Total play = play, shaft (120) pressed in + play, shaft (120) pulled back

Target value: 0.02 mm ... 0.07 mm (play)
In the event of deviations, correct using shims (124).

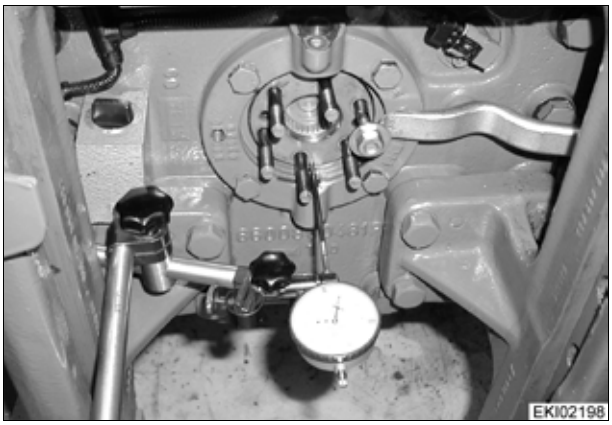

Fig. 88. I003722

Flanged pin splined shaft 6-part 1 3/8" or:
Flanged pin involute 21-part 1 3/8"
Flanged pin splined shaft 6-part 1 3/4"
Flanged pin involute 20-part 1 3/4"

NOTE: *The flange pin has four impulse bores (arrow) for the B020 rear PTO stub shaft sensor*

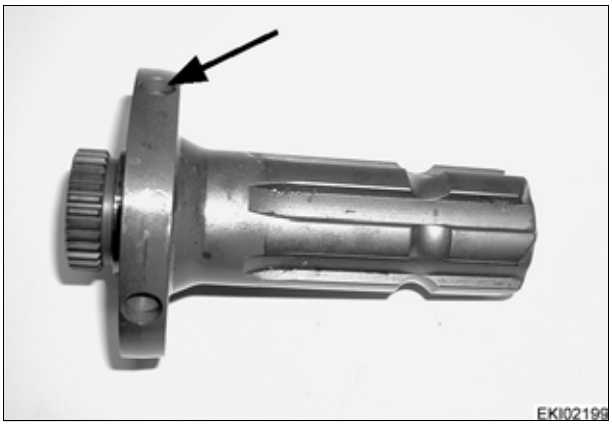

Fig. 89. I003723

Put the flange pin (137) in place.
Fit the spacer (132).

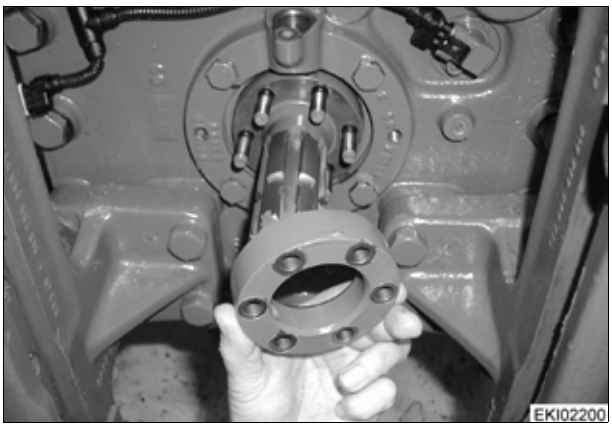

Fig. 90. I003724

Clamp the flange pin (137) tight with screw M16 (arrow). (Assembly kit)
Tighten the hex nuts (134) (M10 - 10) with 69 Nm .
Replenish transmission oil.

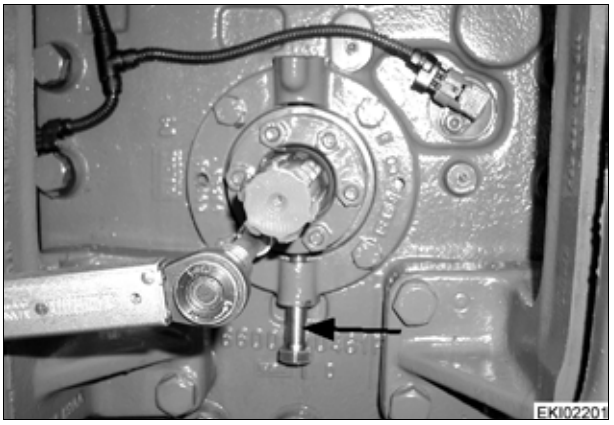

Fig. 91. I003725

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Transmission/front wheel drive

1320 Transmission/front wheel drive

G Repair 5

G Repair

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2 Fitting the front wheel drive clutch 11

1 Removing and dismantling the front wheel drive clutch

Preliminary work:

– *see §1*

– Separate the transmission housing from the clutch housing – Chapter ...

NOTE: *The work was carried out on a model for greater clarity.*

Remove the screw M8 and the fixing washer

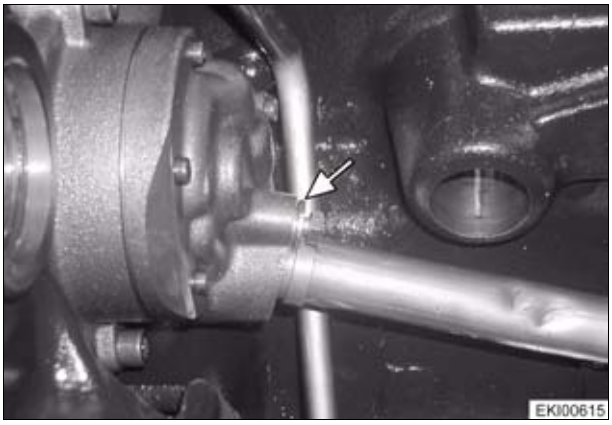

Fig. 1. I002907

Push the suction pipe out of the filter housing

Fig. 2. I002757

Dismantle the cover of the suction filter

Fig. 3. I002758

Remove the suction filter

Fig. 4. I002759

Remove the suction filter housing

Fig. 5. I002760

Remove the hex bolts of the shielding panels

Fig. 6. I002764

Remove the hex bolts and press off the cover with two screws

Fig. 7. I002761

Pull out the shaft with a slide hammer puller

Fig. 8. I002762

Pull out the shaft

CAUTION: After dismantling the shaft the front wheel drive clutch has no guide
Risk of injury!

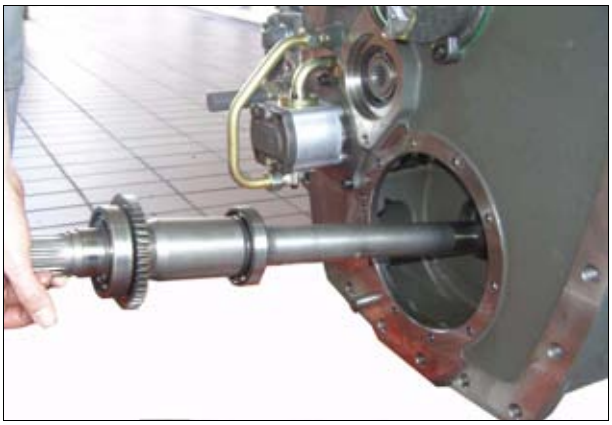

Fig. 9. I002763

Remove the front wheel drive clutch completely from the housing

Fig. 10. I002765

Fit the assembly bracket
Press the belleville package using a press until the circlip can be moved freely.
Remove the circlip and release the press carefully

Fig. 11. I002766

Remove the spur gear

Fig. 12. I002767

Remove the belleville package

Fig. 13. I002768

Remove the piston and the disc package from the disc carrier

Fig. 14. I002769

2 Fitting the front wheel drive clutch

NOTE: *The work was carried out on a model for greater clarity.*

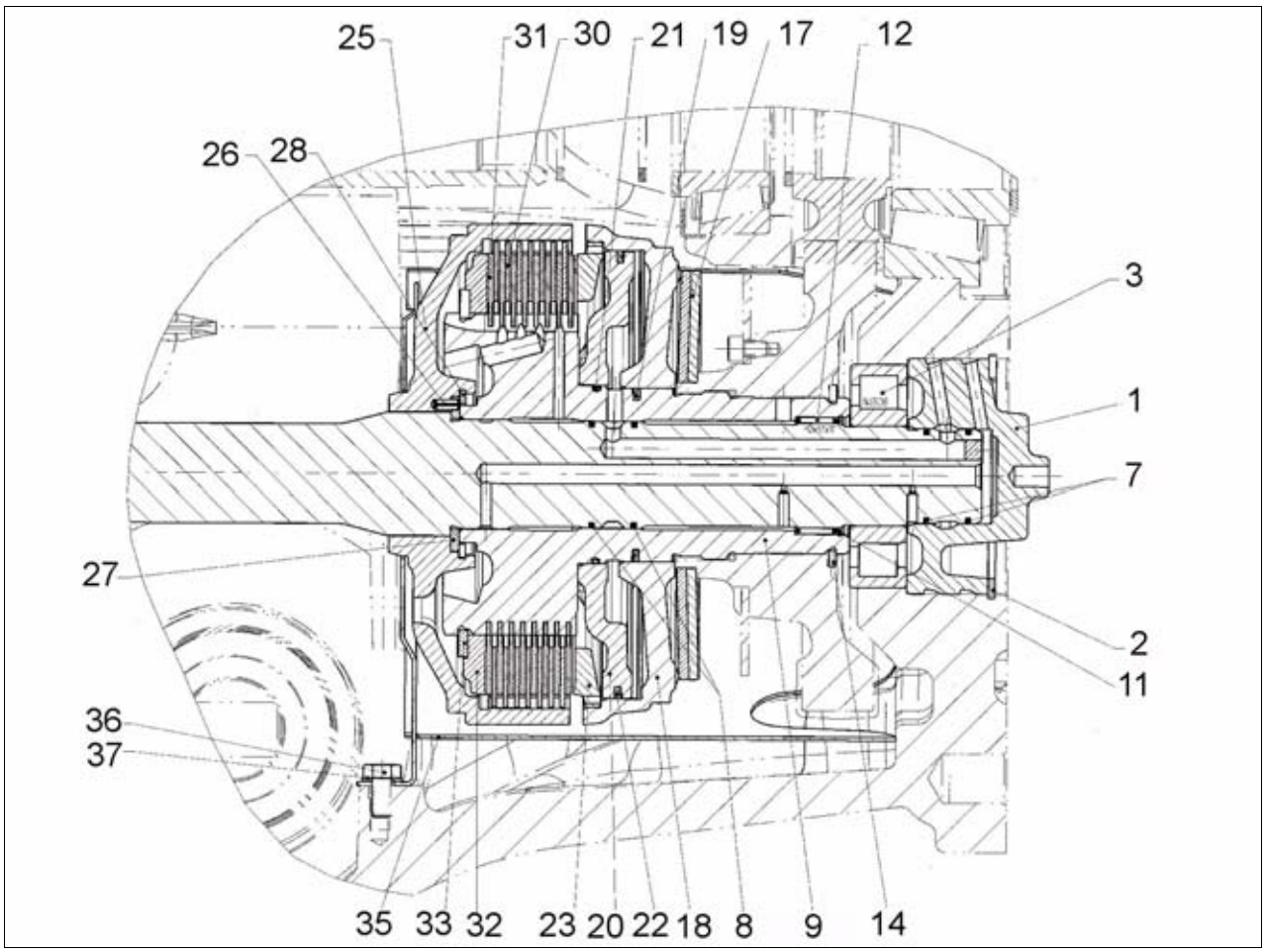

Fig. 15. I002780

Item	Designation	Item	Designation
1	Cover	23	Supporting plate
2	Circlip	25	Bell housing
3	Cylinder roller bearing	26	Dowel pin
5	Shaft	27	Washer
6	Screw plug	28	Circlip
7	Rectangular-section ring	30	External disc
8	Rectangular-section ring	31	Internally toothed disc
9	Disc carrier	32	Supporting plate
11	Snap ring	33	Circlip
12	Needle bearing	35	Shroud
14	Circlip	36	Hex bolt
15	Spur gear	37	Washer
17	Bellville spring pack	39	Deep-groove ball bearing
18	Piston	40	Spur gear
19	Lip seal	41	Deep-groove ball bearing
20	Piston disc	42	Shim pack
21	O-ring	43	Circlip
22	Lip seal		

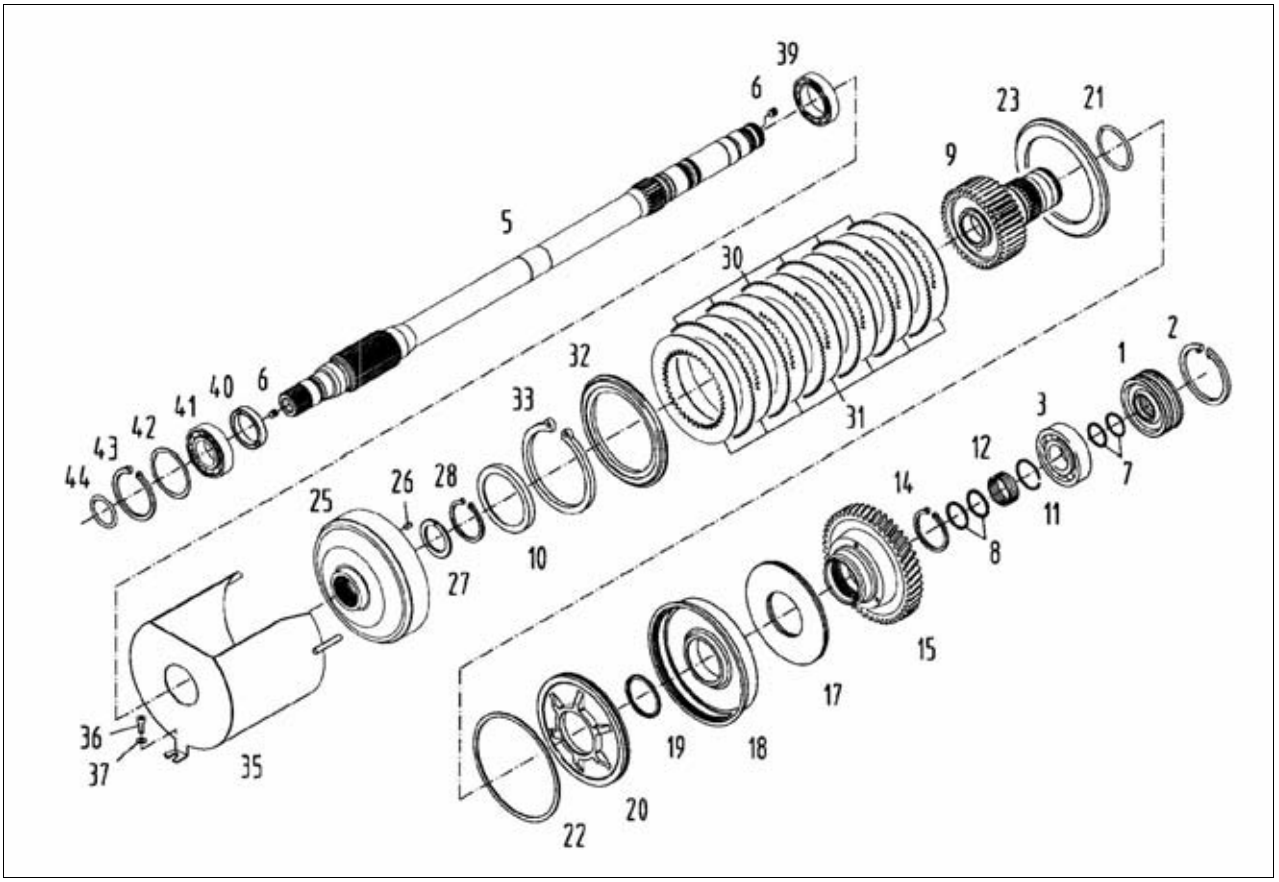

Fig. 16. I002781

Item	Designation	Item	Designation
1	Cover	23	Supporting plate
2	Circlip	25	Bell housing
3	Cylinder roller bearing	26	Dowel pin
5	Shaft	27	Washer
6	Screw plug	28	Circlip
7	Rectangular-section ring	30	External disc
8	Rectangular-section ring	31	Internally toothed disc
9	Disc carrier	32	Supporting plate
11	Snap ring	33	Circlip
12	Needle bearing	35	Shroud
14	Circlip	36	Hex bolt
15	Spur gear	37	Washer
17	Bellville spring pack	39	Deep-groove ball bearing
18	Piston	40	Spur gear
19	Lip seal	41	Deep-groove ball bearing
20	Piston disc	42	Shim pack
21	O-ring	43	Circlip
22	Lip seal		

Fit new lip seal (22) into the piston disc (20)

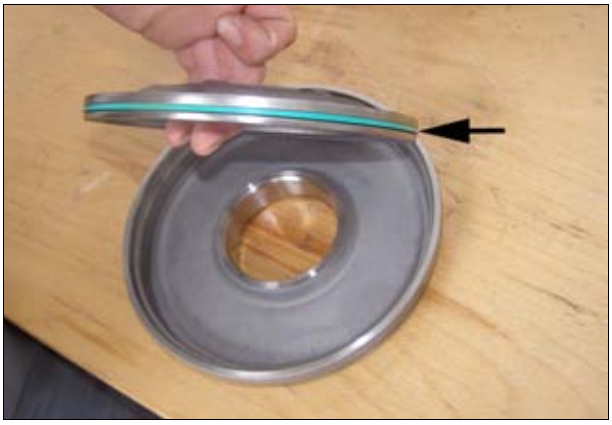

Fig. 17. I002770

Fit the piston disc (20) into the piston (18)

Fig. 18. I002771

Fit new lip seal (19) and O-ring (21) into the disc carrier

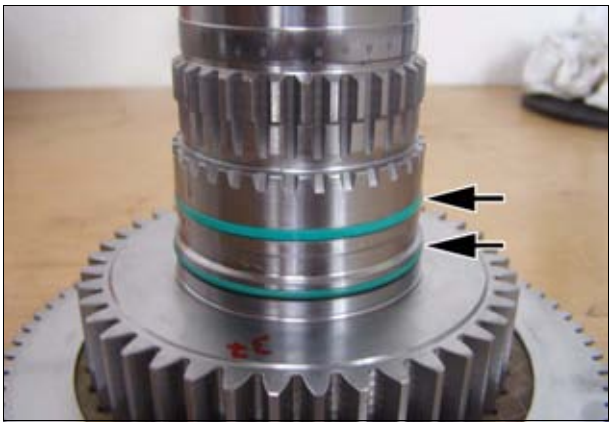

Fig. 19. I002773

If necessary, replace the needle bearing (12)

Fig. 20. I002772

Fit the disc carrier (9) into the clutch bell housing (25)

Fig. 21. I002791

Fit the supporting plate (32) and the disc package (30, 31) to the disc carrier

NOTE: *Fit the supporting plate (32) with the groove to the bell housing (25)*
Begin with an internal disc (31)

Fig. 22. I002792

Fit the supporting plate (23) with the groove to the internal disc

Fig. 23. I002793

Fit the piston (18) with the piston disc (20)

Fig. 24. I002794

Fit the bellville spring pack (17)

NOTE: *Both bellville springs with the curve upwards*

Fig. 25. I002795

Fit the spur gear (15)

Fig. 26. I002767

Fit the assembly bracket
Press the bellville spring pack (17) together with a clamp
Snap on the circlip (14)

Fig. 27. I002766

Install the front wheel drive clutch and shroud (35) into the transmission housing

Fig. 28. I002786

Emplace and lock the rectangular-section rings (7, 8) into the grooves of the shaft (5)
Turn each of the rectangular-section rings through 180° and grease

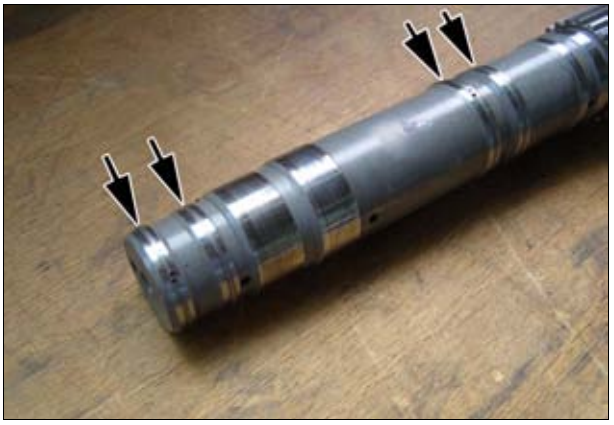

Fig. 29. I002785

Fit the shaft (5)

NOTE: *When fitting the shaft (5) ensure that the rectangular section rings (7, 8) are not damaged*

Fig. 30. I002787

Fit the shim pack (42) and bearing cover
Fit a new shaft sealing ring into the bearing cover

Fig. 31. I002761

Using a measuring scale, check the play of the shaft (5)
Target = 0.3+01
If there is any deviation, adjust the play by means of the shim pack (42)

Fig. 32. I002796

Fit the suction filter housing

Fig. 33. I002760

Fit new O-rings to the suction pipe

Fig. 34. I002776

Insert the suction pipe into the suction filter housing

Fig. 35. I002799

Fit the screw M8 and fixing washer

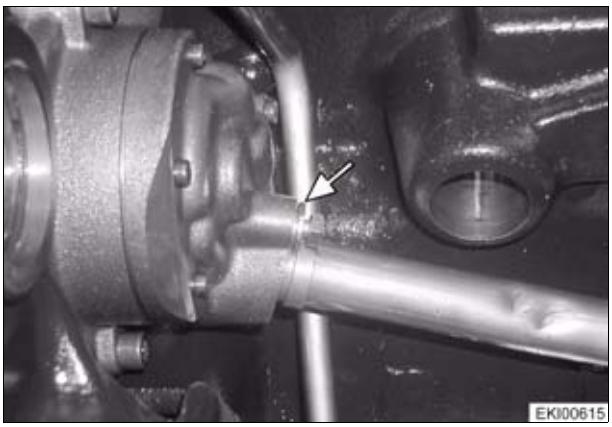

Fig. 36. I002907

Fit the suction filter

Fig. 37. I002759

Fit the suction filter cover with a new O-ring

Fig. 38. I002758

Final procedures:

- *see §2*
- *see §6*

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2000

Overall system/engine

2000 Overall system/engine

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A General

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1 General description of the common rail system

All previous systems operated by generating the fuel injection pressure separately for each injection event. The injection pressure increases in principle with increasing fuel quantity and increasing engine speed. Between injection events, the pressure in the system is low.
In contrast to these well-known systems, in the accumulator injection or common rail system, pressure generation is decoupled from injection events. The generation of pressure bears no relation to either the engine speed or injection quantity; the pressure is instead freely selectable within limits and is continuously available from the high-pressure accumulator (rail). The accumulator comprises the distribution rail and pipes to the injectors. The fuel quantity for the individual cylinders is taken from this accumulator.

One injector for each engine cylinder
The core of the system is a solenoid-activated injector for every engine cylinder. A pulse from the control unit to the solenoid valve in the injector initiates the injection procedure. The discharge cross-section of the injector, the opening duration of the solenoid and the accumulated pressure in the common rail system determine the fuel quantity.

Variable pressure in the accumulator
In the Deutz common rail system, the accumulator pressure is generated by two high-pressure pumps. These are activated by the camshaft. On 4-cylinder-engines, the camshaft has 2 cams per pump; on 6-cylinder engines it has 3 cams per pump. This means that fuel is delivered into the rail by the pumps, every time an injector is opened. The exact quantity to be injected by the injector is released by the dispensing unit. This keeps the rail pressure constant.
In the common rail system, pressure in the accumulator is controlled by means of a pressure sensor. The rail pressure is freely programmable between 700 bar and 1400 bar using a mapping field (programming) and can be adapted to suit the engine's operating conditions. The control unit, sensors and system functions of the common rail system require more input signals than the standard single pump system.

See the comparison between EMR 2 (COM II) and EMR 3 (COM III).

Free selection of the injection pressure in the mapping field
The functional separation of pressure generation and injection opens up new possibilities in terms of the combustion process structure. Injection pressure is freely selectable in the mapping field and remains largely constant during the injection event. The maximum rail pressure is approx. 1400 bar.

Further reductions in exhaust gas and noise emissions
A reduction in exhaust gas and noise emissions is possible thanks to multiple injection. Multiple injection means—depending on the operating conditions—a pre-injection, main injection and a post-injection. These are triggered by multiple activation of quick-response solenoids. In addition, the injection process can be shaped by controlling the profile of the nozzle needle movement.
Hydraulic support on closing the nozzle needle ensures an abrupt end to the injection process.
The multitude of possibilities for configuring the injection process opens up new paths towards further reductions in pollutant emissions and the fuel consumption of diesel engines.
No major changes to the design of the engine
The common rail system can replace conventional injection systems without major changes to the engine. Instead of the injection pumps cylinders 1 and 2, two high-pressure pumps are fitted. The injectors are integrated into the cylinder head like a nozzle-holder combination.

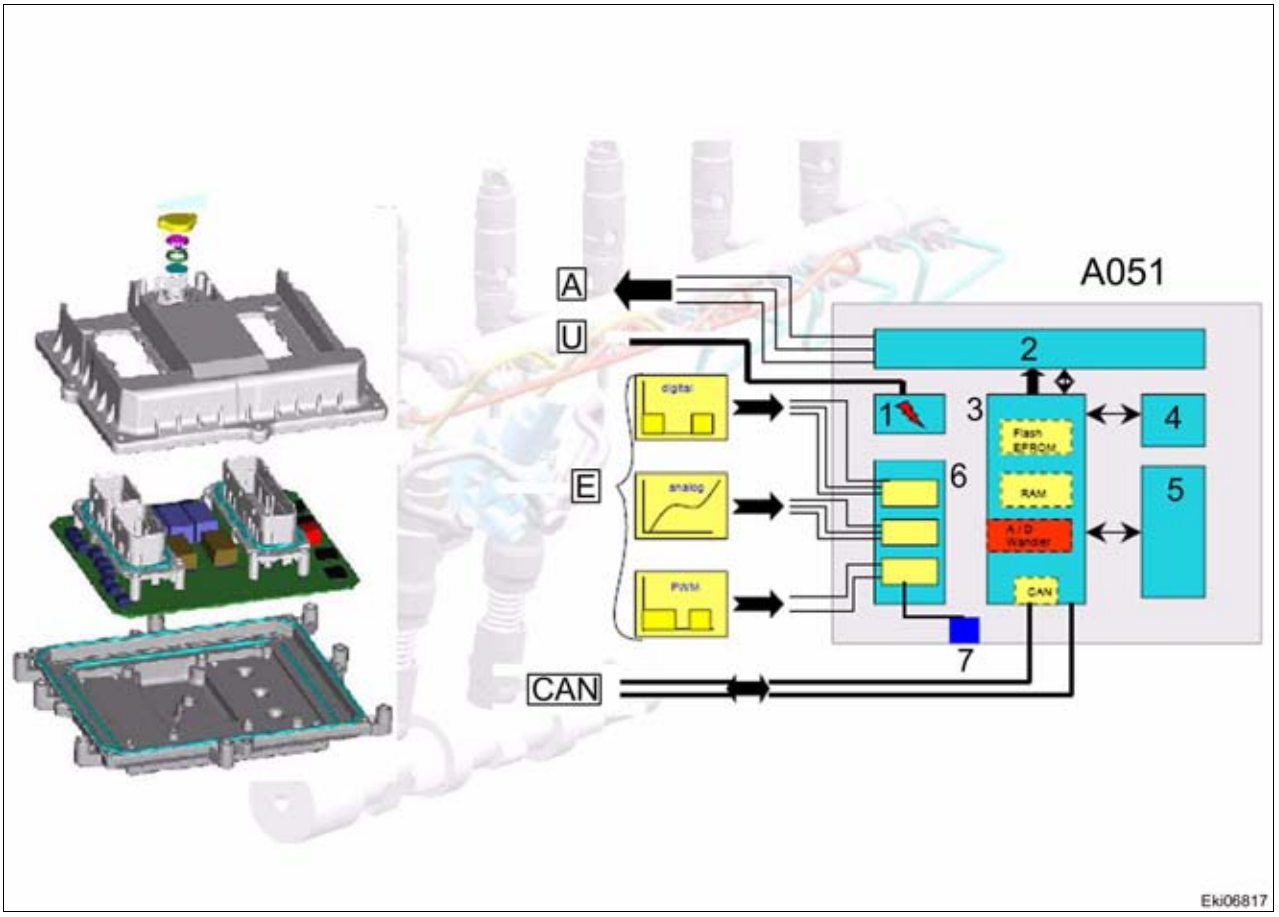

Fig. 1. I006081

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

The electronically regulated diesel injection (EDC) is divided into 3 central system blocks.
The **sensors** and **switches** (information providers, input) record the operating conditions at the engine and convert the various physical variables into electronic signals.
In the **control unit** (processing), the information and the output signals are calculated in accordance with the stored mapping fields and characteristic curve. The control unit contains microprocessors and memory units. The control unit incorporates self-monitoring, the emergency running program and self-diagnostics.
The **actuators** (outputs) convert the electronic output signals into mechanical variables.
In addition:
A good power supply is required, so that the control unit can operate reliably.
This comprises:

– Unswitched supply terminal 30
– Switched supply terminal 15
– Earth supply terminal 31

The control unit is also connected to the CAN bus system of the tractor.

– Sensor signals are used for several purposes e.g. engine temperature
– Transmission Control System (TMS)
– Diagnostics

– programming

Comparison between EMR 2 (COM II) and EMR 3 (COM III).

Sensors and switches for EMR 2 (COM II)

Component	Duty
B041 EMR (camshaft) sensor	Reports the engine speed (actual value)
B042 EMR (crankshaft) sensor	Reports the engine speed (actual value);
B048 sensor, water temperature	Reports the engine temperature. This signal value is used for: Engine management, temperature display and for activating the heater flange
B053 charge-air temperature/charge-air pressure sensor	Reports the charge-air temperature (NTC) and the charge air pressure "LDA function"
B055 combination sensor, foot throttle sensor	One signal value is reported to the A002 ECU, enhanced control (normal mode)
	The second signal value is processed in the A051 ECU, engine control unit (emergency mode, with loss of enhanced control functions)
Position sensor in the Y035 EMR actuator	Reports the position of the control linkage
Note:	The two speed sensors B041 and B042 are fitted in order to provide
	diagnostics capability and emergency running characteristics

Sensors and switches for EMR 3 (COM III)

Component	Duty
B004 - Vacuum switch (air filter)	The signal is reported to the engine control unit and from there forwarded via the CAN bus system to the instrument panel (warning message)
B055 - Sensor, foot throttle	One signal value is reported to A002 ECU, enhanced control (normal operation) the second signal value is processed in the A051 ECU engine control unit (emergency mode, with loss of enhanced control functions)
B085 - Camshaft speed sensor	Reports the camshaft speed (actual value) and the position of the camshaft at cylinder 1 ignition
B086 - Rail pressure sensor	Reports the current pressure in the rail
B087 - Fuel low pressure sensor	Reports the fuel primary pressure
B088 - Crankshaft speed sensor	Reports the engine speed (actual value) and the position of the crankshaft TDC cylinders 1 and 4, or TDC cylinders 1 and 6.
B089 - Engine temperature sensor (Deutz)	Reports the engine temperature. This signal value is used for: Engine management, temperature display and for activating the heater flange
B090 - Sensor, oil pressure	Reports the oil pressure
B091 - Sensor, water in fuel	The signal is reported to the engine control unit and from there forwarded via the CAN bus system to the instrument panel (warning message)
B092 - Sensor, charge air pressure/temperature	Reports the "LDA function" charge air pressure and the charge-air temperature (NTC)
Note:	Two rotational speed sensors are fitted. These synchronise the injection, are used for diagnostics capabilities and to determine emergency running characteristics

Actuators of the EMR 2 (COM II)

Component	Duty
K034 relay (for R002 heater flange)	The relay is energised at temperatures of 5°C and below. In addition the indicator lamp on the instrument panel is energised
Y035 EMR actuator	The actuator is energised (PWM) by a certain control linkage movement (load demand)

Actuators of the EMR 3 (COM III)

Component	Duties
B077 - Engine fan (speed sensor/magnetic clutch)	The fan speed is controlled via the engine control unit so that the coolant water temperature is maintained at approx. 95°C. However, the fan can also be controlled by the hydraulic oil temperature and the transmission oil temperature.
K008 - Relay, starter lockout	The starting process is controlled by the engine control unit. When all input signals are present the relay is closed. If the rotational speed signals (camshaft/crankshaft) are not present after 5 sec, the start process is aborted
K063 - Heater flange relay	The relay is energised at temperatures of 5°C and below. In addition the indicator lamp on the instrument panel is energised
Y006 - Solenoid valve, engine brake	The engine brake is actuated by the engine control unit if the engine speed exceeds 900 rpm
Y091 - Dispensing unit (fuel)	The rail pressure is regulated by the dispensing unit in conjunction with the rail pressure sensor
Y094 - Actuator unit, AGR (exhaust gas recirculation)	The the actuator unit diverts exhaust gas into the engine
Y095 to Y101 injectors 1 to 6	The injectors inject fuel up to 3 times per working cycle

2 Emergency mode (emergency running)

DANGER: After switching off the diesel engine, wait at least 30 seconds before starting any work on the fuel system!

If the A051 ECU, engine control unit (EDC 7) detects a fault in the fuel system, it initiates emergency mode.

Warning message **High-pressure limiting valve opened**
A fault code FC 1E.1.51 is logged

Running in emergency mode means:
The Y091 dispensing unit is no longer energised. This causes the high pressure of the fuel in the rail to rise, leading to the high pressure limiting valve opening (at approx. 1800 bar).
When the high-pressure limiting valve is open, the high pressure of the fuel in the rail falls to approx. 700 bar. When the fuel passes through the open high-pressure limiting valve, it is rapidly heated. Therefore the engine can run only a maximum of 4 minutes in emergency mode, after which the A051 ECU, engine control unit (EDC 7) automatically shuts the engine down.
The high-pressure limiting valve cannot be closed whilst the engine is running; it can be closed only by shutting down the diesel engine, either by the A051 ECU, engine control unit (EDC 7) or by the driver, following which after approx. 30 seconds the high-pressure limiting valve closes.

NOTE: *After the high-pressure limiting valve has been actuated approx. 30 times, it should be replaced.*
If leaks occur in the high-pressure limiting valve, the fuel is heated.

3 Deutz Common Rail principle

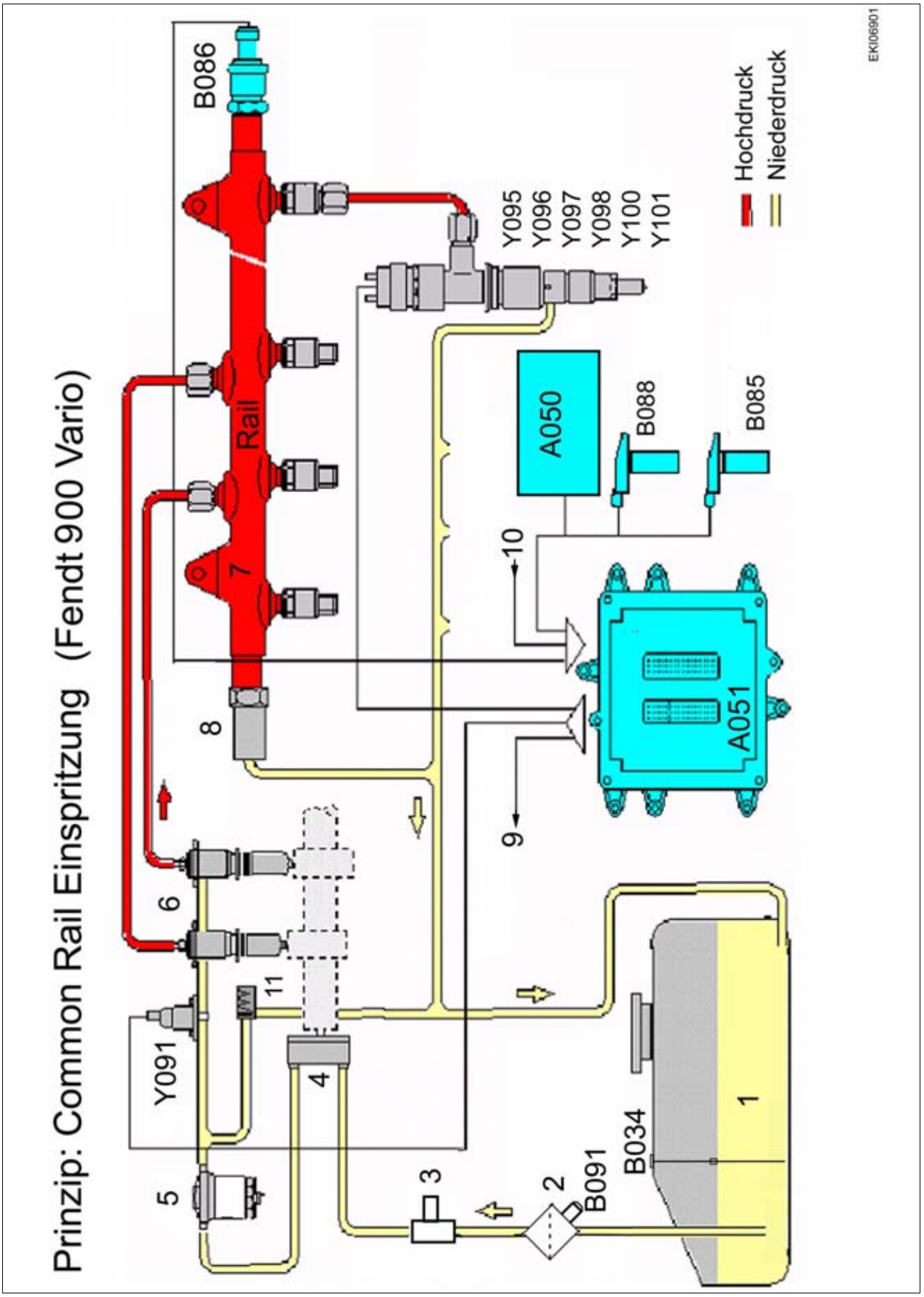

Fig. 2. I007321

Item	Designation	Item	Designation
1	Right/left fuel tank	**B034** - Immersed tube sensor (fuel)	
2	Water sedimentor (pre-filter)	**B055** - Sensor, foot throttle	
3	Hand pump	**B085** - Camshaft speed sensor	
4	supply pump	**B086** - Rail pressure sensor	
5	Fuel filter (main filter)	**B087** - Fuel low pressure sensor	
6	High-pressure pump	**B088** - Crankshaft speed sensor	
7	Common rail (high-pressure accumulator)	**B091** - Sensor, water in fuel	
8	High-pressure limiting valve	**Y091** - Dispensing unit (fuel)	
9	Other actuators (e.g. exhaust gas recirculation)	**Y095** - Injector valve 1 (injector)	
10	Other sensors (e.g. B055 -foot throttle sensor)	**Y096** - Injector valve 2 (injector)	
11	Overflow valve	**Y097** - Injector valve 3 (injector)	
		Y098 - Injector valve 4 (injector)	
A050 - ECU, basic control unit		**Y100** - Injector valve 5 (injector)	
A051 - ECU, engine control unit (EDC 7).		**Y101** - Injector valve 6 (injector)	

4 A051 ECU, engine control unit (EDC 7)

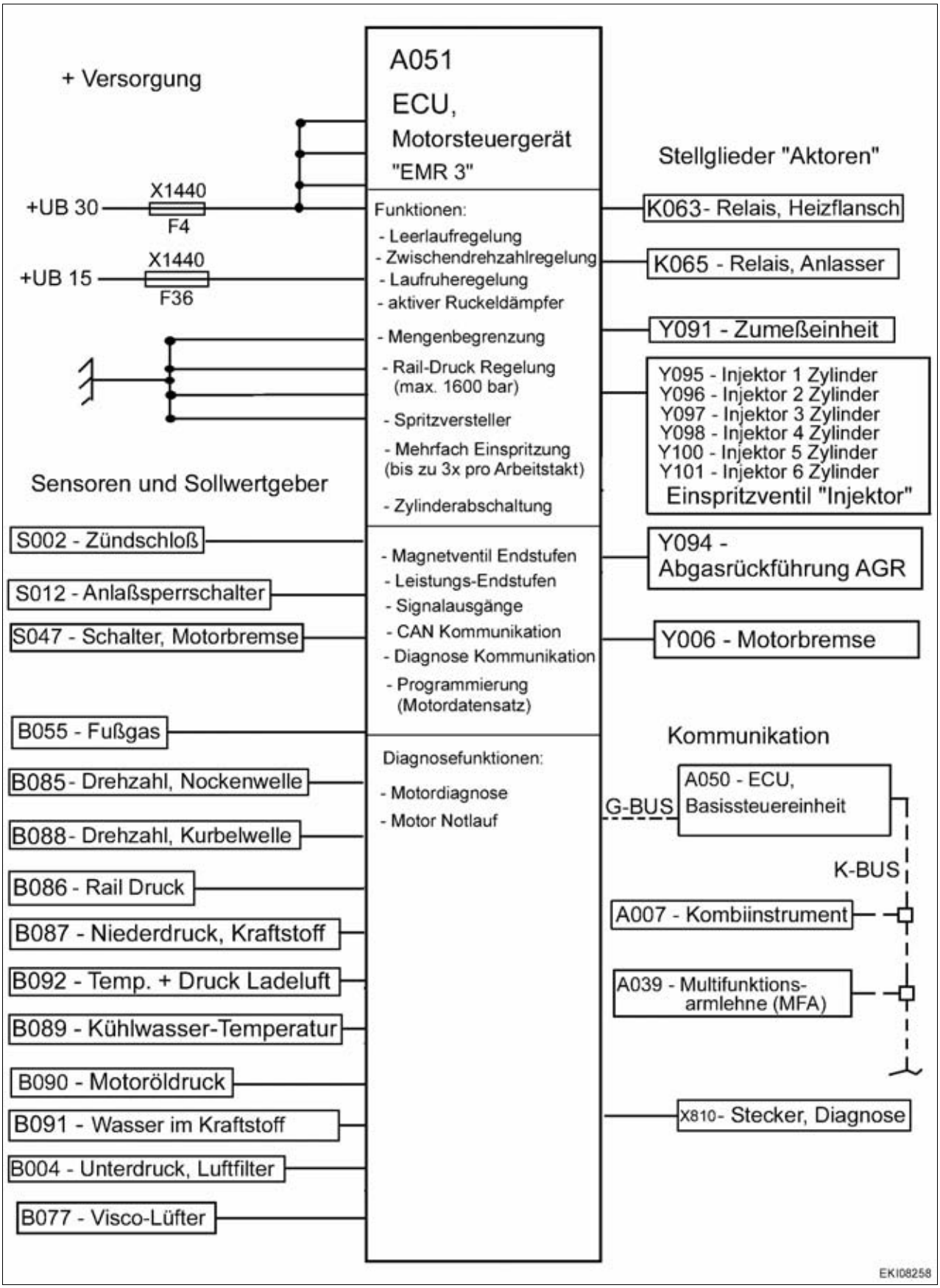

Fig. 3. I007324

Functions of the A051-ECU, engine control unit (EDC 7)

The A051 - ECU, engine control unit (EDC 7). **manages and controls the engine.**
The **A051** - ECU, engine control unit (EDC 7). has the following management functions:

All speed control
The **A051** - ECU, engine control unit (EDC 7). keeps the engine under constant load at the speed set by the foot throttle, hand throttle and memory key (target value), as long as the engine is capable of providing the necessary power.
Restriction of the maximum engine speed ("engine cut-off speed")

Torque restriction
Restriction of the maximum torque (maximum injection quantity)

Rail pressure restriction
The **Y091** - Dispensing unit (fuel) dispenses the exact fuel quantity to the rail that will be discharged by the injectors (Y095 to Y101). Control is exercised by the **B086** - Rail pressure sensor, which reports the actual pressure to the **A051** - ECU, engine control unit (EDC 7)..

Multiple injection
With a view to a reduction in exhaust gas and noise emissions, the injectors (Y095 to Y101) are activated by the **A051** - ECU, engine control unit (EDC 7). up to 3 times per working cycle.

Cylinder switch-off
If the **A051** - ECU, engine control unit (EDC 7). detects a short circuit at an injector (Y095 to Y101) (short circuit low-high), this injector is no longer activated (shut down).

Engine start
If all input signals are present the start procedure is initiated.

NOTE: *If the rotational speed signals (camshaft / crankshaft) are not present after 5 sec, the start process is aborted*

Engine stop
The injectors cease to be activated.

Monitoring and signal output functions
Coolant temperature and charge-air temperature –> for fault displays and/or reductions in power see chapter 0000 Reg. B - Fault code table

Charge pressure-dependent engine management ("LDA function")
If the charge-air temperature increases, the injection quantity will be restricted. If the charge-air pressure drops, the injection quantity will be restricted.
Preventing smoke formation

NOTE: *The **A051** - ECU, engine control unit (EDC 7). contains an atmospheric pressure sensor. Boost pressure (over pressure) = absolute pressure (B092 sensor) - atmospheric pressure (A051 ECU).*

Altitude correction
Avoidance of smoke plumes at low air density
Engine protection at low air density.
At high altitudes (Andes, Himalayas, etc.) the maximum engine power is restricted

Temperature-dependent start control ("excess fuel at starting")
Improved starting characteristics, engine protection at cold start without smoke plumes

Actuation of the cold start system
The R002 heater flange is activated by the **A051** - ECU, engine control unit (EDC 7).. The indicator lamp for the **R002** - Heater flange is located in the **A007** - Instrument panel.

Actuation of the injectors
Energising the injector causes fuel to be injected; the duration determines the quantity that is injected
The injectors inject fuel up to 3 times per working cycle

Activation of the exhaust gas recirculation (AGR)
Depending on the operating conditions of the engine, a certain quantity of exhaust gases are fed back into the engine

Emergency mode/Engine shutoff if necessary
see chapter 0000 Reg. B - Fault code table
see chapter 2000 Reg. A - Emergency mode

Actuation of the engine brake
The **Y006** - Solenoid valve, engine brake is actuated by the **A051** - ECU, engine control unit (EDC 7)..

Fault log in the A051 - ECU, engine control unit (EDC 7).
The **A051** - ECU, engine control unit (EDC 7). forwards the EMR fault data to the **A007** - Instrument panel, where the error messages are output on a display. (FENDT fault code)

Fault diagnosis using the SERDIA service diagnostics program
Reads all the sensors and the **A051** - ECU, engine control unit (EDC 7). ("program: Measured values")

Displays measured values graphically ("program: Measured values graphics") Reads the fault log (SERDIA fault log) Tests the functioning of all actuators ("program: Function test")

Loads engine data record using the Service - Diagnostics program (SERDIA)
For optimum management of the diesel engine by the **A051** - ECU, engine control unit (EDC 7)., the reference data (maximum power, engine cut-off speed, the engine mapping field (injection quantity at a specific operating point), maximum permissible operating temperature etc.) must be loaded into the **A051** - ECU, engine control unit (EDC 7)..
The engine data record (consisting of the reference data, engine-specific data (mechanical tolerances), fittings (power pack engine or vehicle engine)) is loaded into the **A051** - ECU, engine control unit (EDC 7)..

NOTE: *If an engine data record that does not match the chassis number of the tractor is loaded, or an **A051** - ECU, engine control unit (EDC 7). that does not match the chassis number of the tractor is fitted, **this will invalidate any claims under warranty, the general operating licence (ABE) and hence also the insurance cover!***
*If an **A051** - ECU, engine control unit (EDC 7). that does not match the chassis number of the tractor is fitted, the power of the tractor will be restricted! The chassis number and engine number of the tractor, and also the interface serial number (interface cable for the SERDIA diagnostics program) are recorded in the **A051** - ECU, engine control unit (EDC 7)..*

Calculated fuel consumption
The **A051** - ECU, engine control unit (EDC 7). calculates the fuel consumption of the diesel engine in litres/hour. This figure is displayed on the instrument panel.

Input signal
The sensors fitted to the diesel engine supply the electronics in the **A051** - ECU, engine control unit (EDC 7). with all the relevant physical variables.

- **B004** - Vacuum switch (air filter)
- **B055** - Sensor, foot throttle
- **B085** - Camshaft speed sensor
- **B086** - Rail pressure sensor
- **B087** - Fuel low pressure sensor
- **B088** - Crankshaft speed sensor
- **B089** - Engine temperature sensor (Deutz)
- **B090** - Sensor, oil pressure
- **B091** - Sensor, water in fuel
- **B092** - Sensor, charge air pressure/temperature
- **Via the CAN bus system:**
- Memory key in the control panel
- TMS Tractor Management System
- Activation of the **B077** - Engine fan (speed sensor/magnetic clutch) by the hydraulic oil and transmission oil temperatures.

Based on information about the current engine status and the inputs (foot throttle, hand throttle, memory keys on the joystick, TMS), the A051 - ECU, engine control unit (EDC 7). manages and controls the actuators.

The actuators fitted to the diesel engine are as follows:

- **B077** - Engine fan (speed sensor/magnetic clutch)
- **K008** - Relay, starter lockout
- **K063** - Heater flange relay
- **Y006** - Solenoid valve, engine brake
- **Y091** - Dispensing unit (fuel)
- **Y094** - Actuator unit, AGR (exhaust gas recirculation)
- **Y095** - Injector valve 1 (injector)
- **Y096** - Injector valve 2 (injector)
- **Y097** - Injector valve 3 (injector)
- **Y098** - Injector valve 4 (injector)
- **Y100** - Injector valve 5 (injector)
- **Y101** - Injector valve 6 (injector)

5 B055 sensor, foot throttle

Pin	Function
1	Earth
2	+ supply (8.5 VDC)
3	Signal
4	Earth
5	+ supply (5.0 VDC)
6	Signal

Fig. 4. I001074

Duty:
The **B055** - Sensor, foot throttle conveys the driver's desired torque/power to the **A051** - ECU, engine control unit (EDC 7)..

Function:
The **B055** - Sensor, foot throttle consists of two potentiometers (redundant).
Potentiometer 1 responds to the rotation of a shaft in the pedal position sensor when the foot throttle (throttle pedal) is depressed. The potentiometer mounted on the end of the shaft transmits an analogue voltage signal to the **A050** - ECU, basic control unit. The **A050** - ECU, basic control unit senses the exact throttle pedal position and hence the driver's current requirement (target value) from the voltage value. So as to improve driving comfort, the throttle pedal position is regulated by a mapping field and further processed to damp it.
The voltage signal from potentiometer 1 is responsible for engine speed control, the throttle pedal module and the Tractor Management System (TMS). The part of the sensor is powered by the tractor electronics **A013** - PCB, microfuses .
If this voltage signal drops out, the tractor switches to emergency mode (loss of enhanced control functions). The engine speed (target value) can then only be transmitted via the foot throttle potentiometer 2. TMS, throttle pedal mode and the memory buttons cannot be pre-selected.
When the foot throttle (throttle pedal) is depressed, **potentiometer 2** responds to the rotation in exactly the same way. This analogue voltage signal is transmitted to the **A051** - ECU, engine control unit (EDC 7).. The **A051** - ECU, engine control unit (EDC 7). senses the exact throttle pedal position and hence the driver's current requirement (target value) from the voltage values. So as to improve driving comfort, the throttle pedal position is regulated by a mapping field and further processed to damp it.
Both voltage signals from the **B055** - Sensor, foot throttle are compared with each other. If control units **A050** - ECU, basic control unit and **A051** - ECU, engine control unit (EDC 7). detect differing values to potentiometer 1 and potentiometer 2, then a plausibility error is output.

NOTE: *see §63*

6 B085 camshaft speed

Pin	Function
1	Signal
2	Earth
3	Shielding against interference

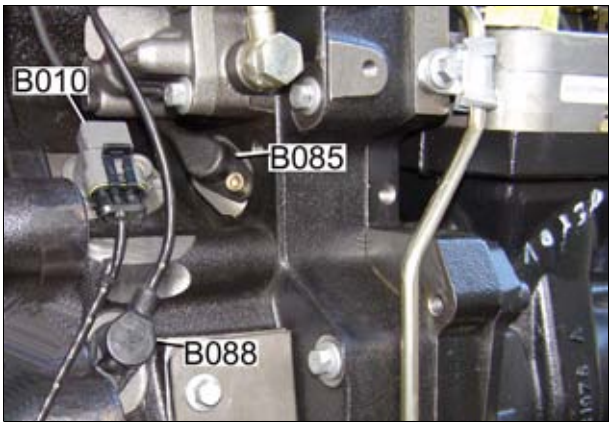

Fig. 5. I001060

Functions of the **B085** - Camshaft speed sensor

Sensing the current engine position (cylinder 1 ignition)
Sensing the engine speed (camshaft speed) for emergency running characteristics
Self diagnosis

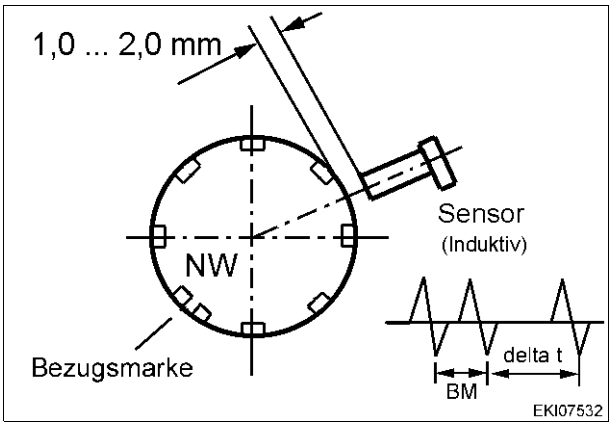

Fig. 6. I005045

The **B085** - Camshaft speed sensor is necessary for the synchronisation of the injection events. It reports the speed and the position of the camshaft at cylinder 1 ignition. This reference mark must then match the **B088** - Crankshaft speed sensor.

When the camshaft is rotating, an alternating voltage (VAC) is induced in the **B085** - Camshaft speed sensor by the marks 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, at TDC cylinder 1 ignition.

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

Induction voltage and frequency

IN Inductive sensor
Ua Induced voltage

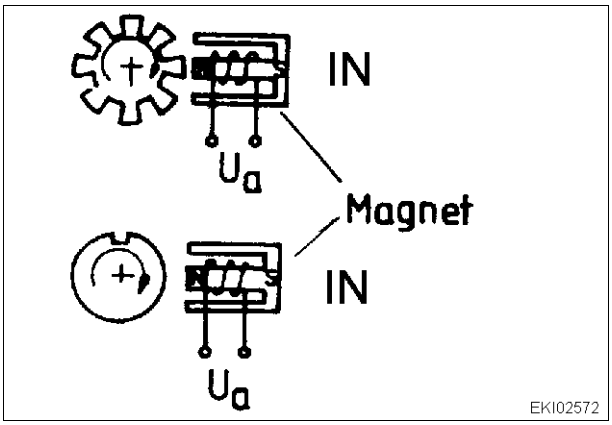

Fig. 7. I001547

Measurement of inductive sensors

The **inductive sensor** receives pulses directly from a pulse generator (gearwheel or disc).
Where the magnetic field of the inductive sensor is intersected by measuring points, an **AC induction voltage (VAC) is generated.**

The A051 - ECU, engine control unit (EDC 7). calculates the speed from the number of voltage pulses (frequency).

The amplitude of the pulse is proportional to the speed (i.e., the voltage increases as the speed increases).

A Reference mark (cylinder 1 ignition)

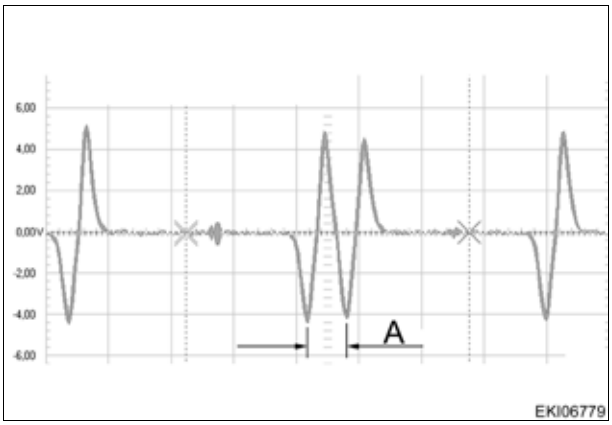

Fig. 8. I005238

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

NW Camshaft gear
delta t Time between voltage peaks

The A051 ECU, engine control unit calculates the speed from the number of voltage peaks.

Clearance between sensor and camshaft gear: 1.0 to 2.0 mm

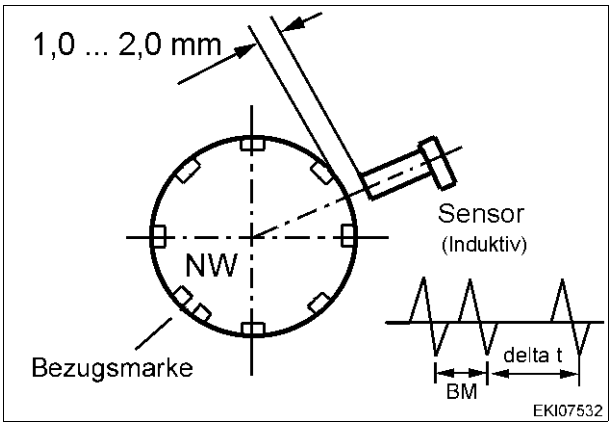

Fig. 9. I001550

NOTE: *see §77*

7 B086 rail pressure sensor

DANGER: After switching off the diesel engine, wait at least 30 seconds before starting any work on the fuel system!

Pin	Function
1	Earth
2	Signal
3	Supply

Fig. 10. I001086

Item	Designation
1	Separation point
2	Evaluation circuit
3	Steel membrane with expansion resistors
4	Pressure connection
5	Thread
p	Rail pressure (400 to approx. 1400 bar during normal operation)

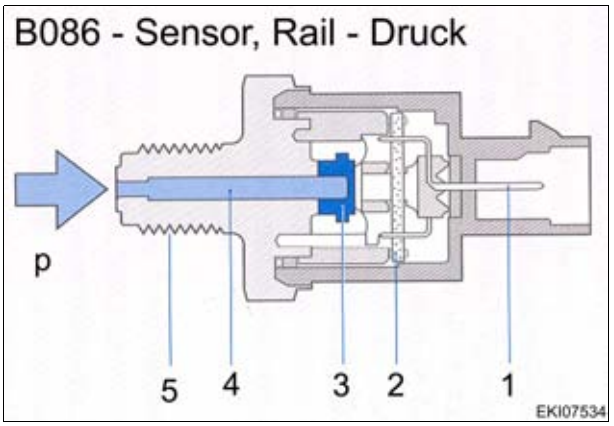

Fig. 11. I002123

Design and mode of operation of the B086 - Rail pressure sensor

The core of the sensor consists of a steel membrane (3) on which expansion resistors have been vapour deposited to form a bridge circuit.

As soon as the pressure to be measured via the pressure connection (4) takes effect on the steel membrane (3), the resistance value of the expansion resistors changes due to the membrane flexion.

The output voltage of 0 to 80 mV generated by the bridge circuit is forwarded to an evaluation circuit (2) via a connecting cable.

The evaluation circuit amplifies the signal to approx. 0.5 VDC at idling speed and approx. 4.5 VDC at maximum pressure, and forwards the signal to the **A051** - ECU, engine control unit (EDC 7)..

With the assistance of the Y091 dispensing unit, the **A051** - ECU, engine control unit (EDC 7). controls the fuel high pressure in the rail (pressure accumulator)

NOTE: *see §78*

The rail pressure is displayed as a target and actual value in the Deutz "SERIDA" diagnostics program.

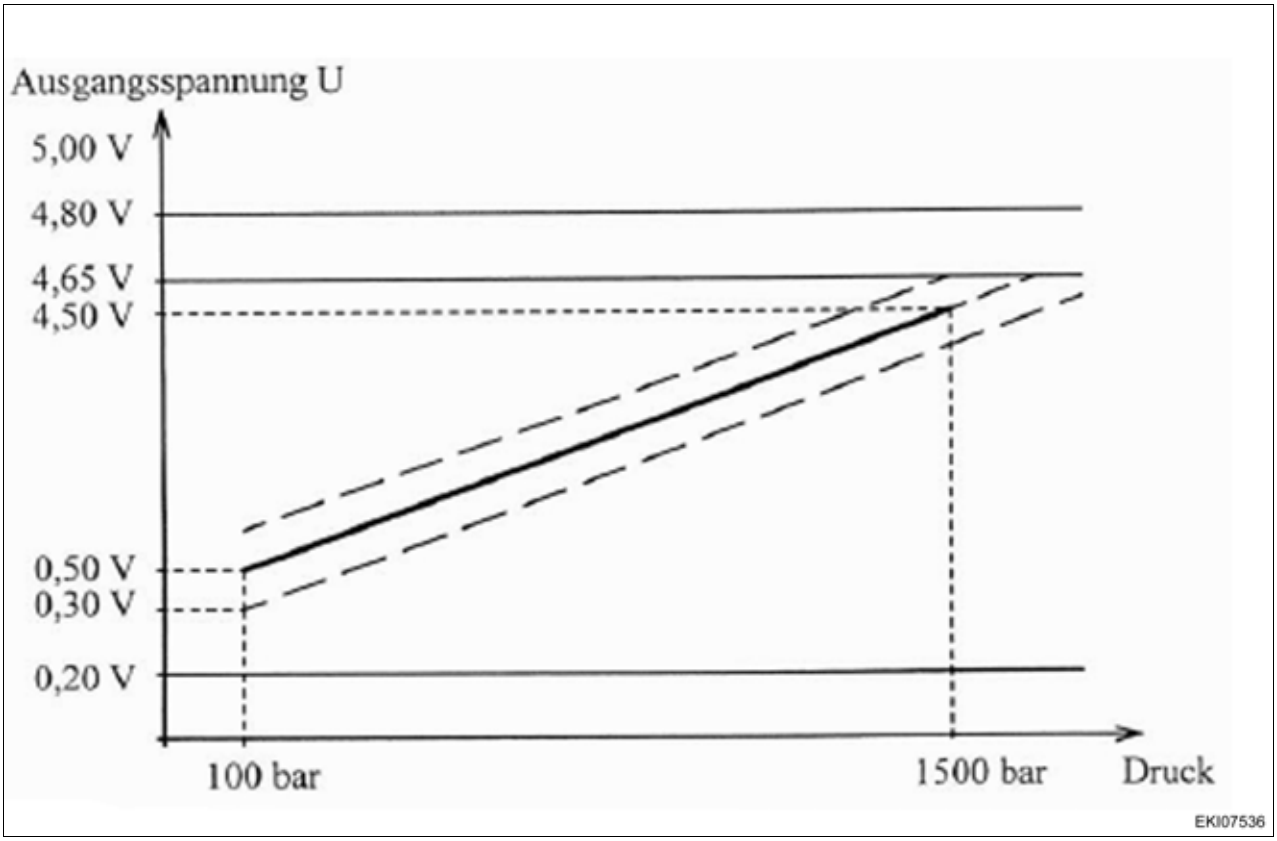

Fig. 12. Voltage pressure diagram I001559

The **B086** - Rail pressure sensor measures the current pressure in the high-pressure circuit and supplies a voltage signal to the **A051** - ECU, engine control unit (EDC 7). for further processing.
The exact reading of the high pressure in the rail is essential for the functioning of the common rail system.
Therefore, the tolerances of the **B086** - Rail pressure sensor are very small during pressure measurement.
Measuring accuracy is within approx. 30 bar.

In the event of fault
The B086 - Rail pressure sensor is determined to be faulty by the A051 - ECU, engine control unit (EDC 7). in the range below 0.2 VDC and above 4.8 VDC.

In the event of a fault, the Y091 dispensing unit is actuated "blind" by the **A051** - ECU, engine control unit (EDC 7)..
The Y091 dispensing unit is de-energised, i.e. fully open.
This causes the high-pressure limiting valve to open.
In idle, this produces a pressure of approx. 400 bar.

Fig. 13. I001172

When the high-pressure limiting valve opens, the warning message **"High-pressure limiting valve opened"** is displayed on the A007 instrument panel.
A fault code FC 1E.1.51 is logged
Since high pressure (approx. 400 bar) is relieved via the pressure-limiting valve, the fuel is heated.
Therefore, the diesel engine is switched off automatically by the **A051** - ECU, engine control unit (EDC 7). after approx. 3 minutes.

Restart tractor

Switch off ignition.
Wait at least 30 seconds until the pressure in the rail (high-pressure accumulator) has dissipated.
Start tractor.

NOTE: *When the high-pressure limiting valve opens, the return line (arrowed) heats up.*
*The diesel engine is switched off by the **A051** - ECU, engine control unit (EDC 7). after approx. 4 minutes.*

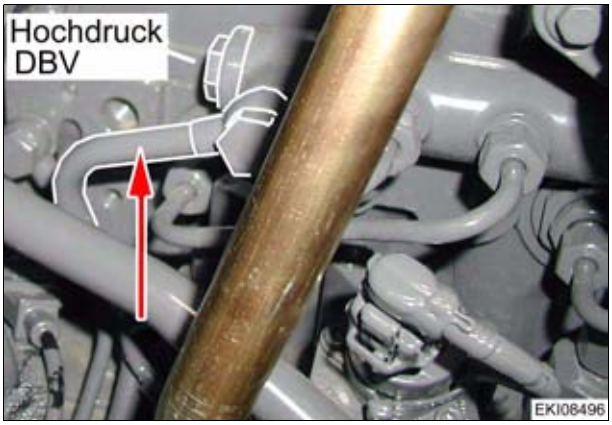

Fig. 14. I002044

8 B087 fuel low pressure and B090 oil pressure sensor

Pin	Function B087	Function B090
1	+ supply	+ supply
2	Signal	Signal
3	Not assigned	Earth
4	Earth	-

Fig. 15. I001087

Duty:
Component **B087** - Fuel low pressure sensor reports the fuel low pressure (primary pressure) to the **A051** - ECU, engine control unit (EDC 7).
Component **B090** - Sensor, oil pressure reports the engine oil pressure to the **A051** - ECU, engine control unit (EDC 7).

Function:
The fuel pressure and oil pressure (physical variables) are converted into a voltage signal (electrical variable). The pressure and the signal voltage are proportional, so that as the fuel pressure increases, the signal voltage increases proportionately.

NOTE: *see §79*
see §82
The fuel low pressure and the oil pressure are output in the Deutz "SERDIA" diagnostics program

9 B088 crankshaft speed

Pin	Function
1	Signal
2	Earth
3	Shielding against interference

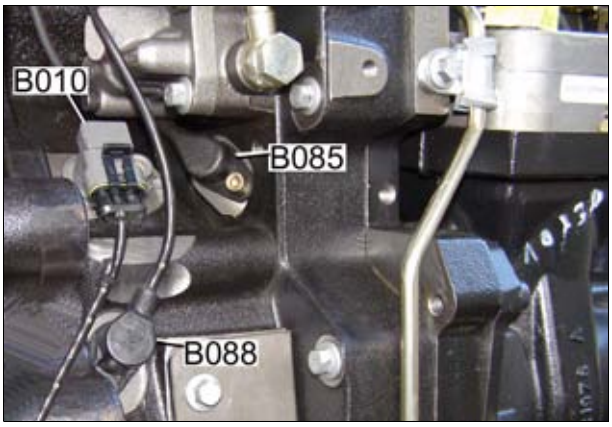

Fig. 16. I001060

Detection of current engine position
(TDC cylinder 1 and cylinder 6)
Detection of engine speed
Self diagnosis

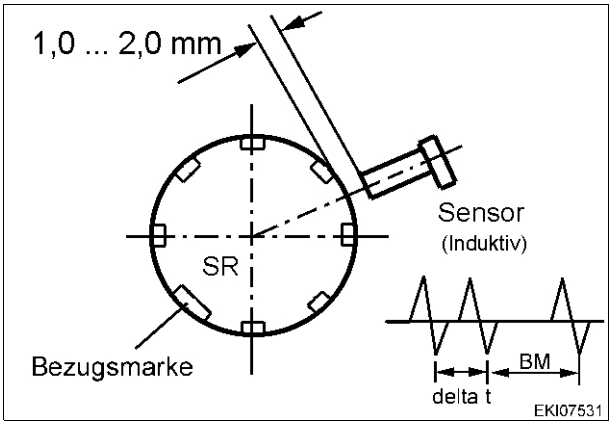

Fig. 17. I005049

As the crankshaft rotates, the teeth of the gear plate on the flywheel induce an AC voltage (VAC) in the **B088** - Crankshaft speed sensor.

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** - Camshaft speed sensor is necessary for synchronising injection. It delivers only 1 TDC signal (1st cylinder combustion) 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

A Reference mark (TDC cylinder 1)

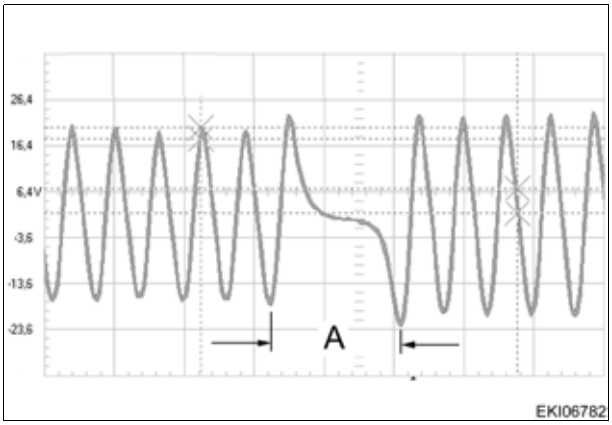

Fig. 18. I005244

NOTE: *see §80*
It is also possible to read the sensor value using the Deutz "SERDIA" diagnostics program.

10 B089 Deutz temperature sensor

Pin	Function
1	Earth
2	Signal

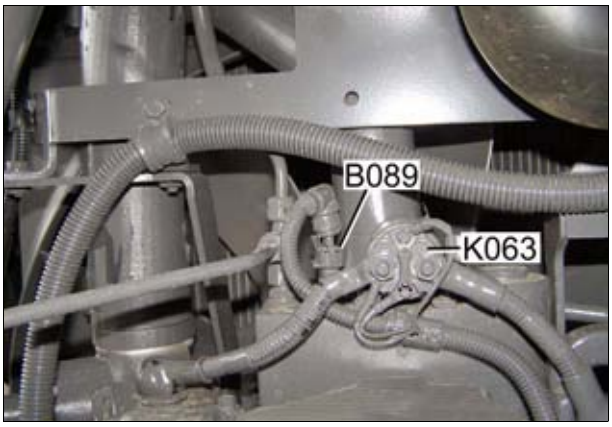

Fig. 19. I001088

Duty:
Component **B089** - Engine temperature sensor (Deutz) reports the engine temperature to the **A051** - ECU, engine control unit (EDC 7)..
This temperature signal is used for many purposes:

– Engine control
– Temperature display on the **A007** - Instrument panel
– Activation of the heater flange at temperatures lower than 5°C
– Report to **B077** - Engine fan (speed sensor/magnetic clutch)

Function:
The resistance of the temperature sensor changes depending on the temperature. The sensor has either an NTC (negative temperature coefficient) or a PTC (positive temperature coefficient) characteristic.
The **B089** - Engine temperature sensor (Deutz) is an NTC sensor, i.e. as the temperature rises, the resistance of the sensor falls.

NOTE: *see §81*
The engine temperature is output in the Deutz "SERDIA" diagnostics program.

11 B091 water in fuel sensor

Pin	Function
1	Earth
2	Signal

Fig. 20. Version A I007328

Pin	Function
1	Earth
2	Signal

Fig. 21. Version B I007329

Version A is fitted up to chassis numbers:
919/../1011; 922/../1006; 925/../1010; 928/../1013; 931/../1009; 934/../1083

Version B is fitted from the following chassis numbers onwards:
919/../1012; 922/../1007; 925/../1011; 928/../1014; 931/../1010; 934/../1084

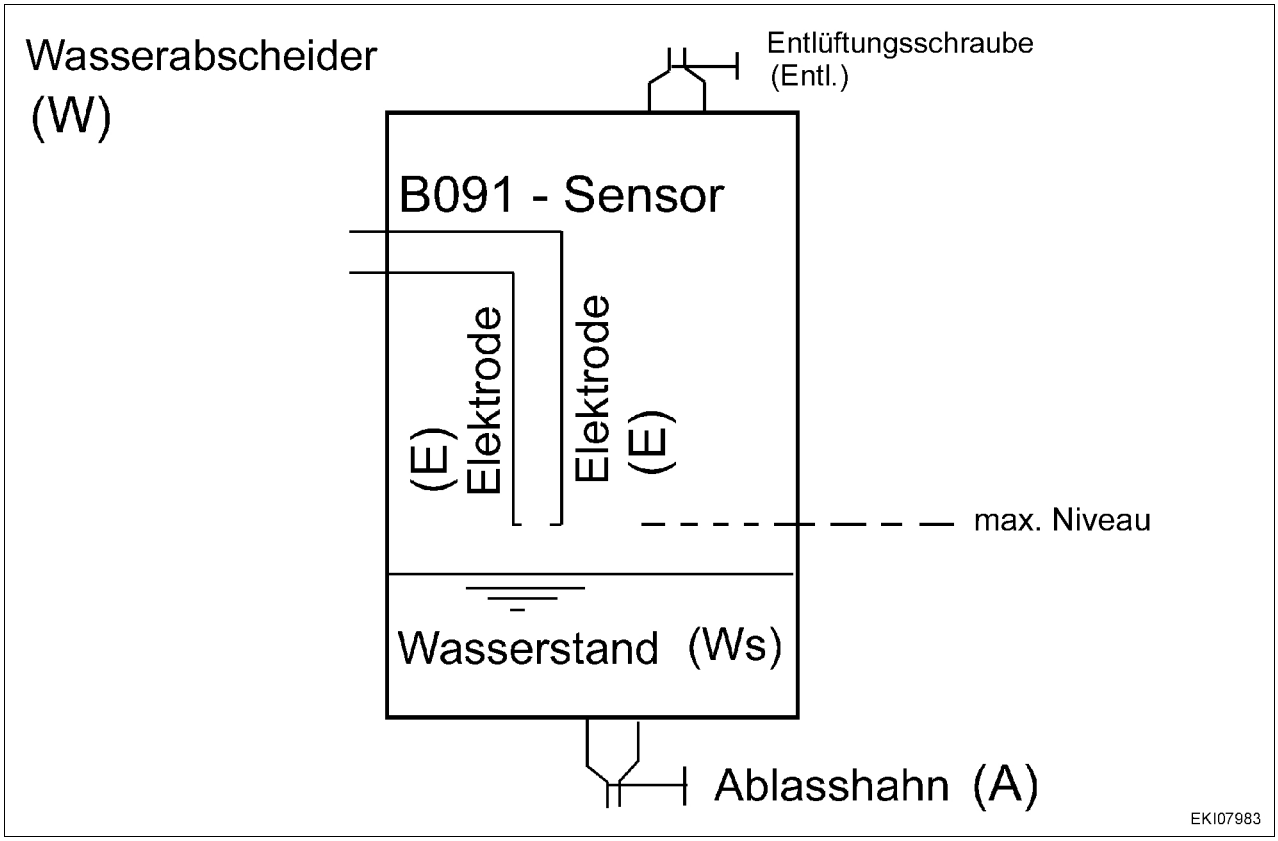

Fig. 22. Function I002155

Item	Designation	Item	Designation
A	Drain cock	Vent	Bleed screw
B091	Water in fuel sensor	W	Water sedimentor
E	Electrode	Ws	Water level

The **B091** - Sensor, water in fuel measures the water level in the water sedimentor. If the water level reaches the maximum, the water forms a contact across the two electrodes. That is then detected as a fault, and the signal is reported by the engine control unit via the bus system to the instrument panel. and is output as the following warning message.

If the water reaches the maximum permitted level:
An alert appears in the multiple display:
Drain water and dirt

NOTE: *see §83*

12 B092 boost pressure/temperature sensor

Pin	Function
1	Earth
2	Temperature signal
3	Supply
4	Pressure signal

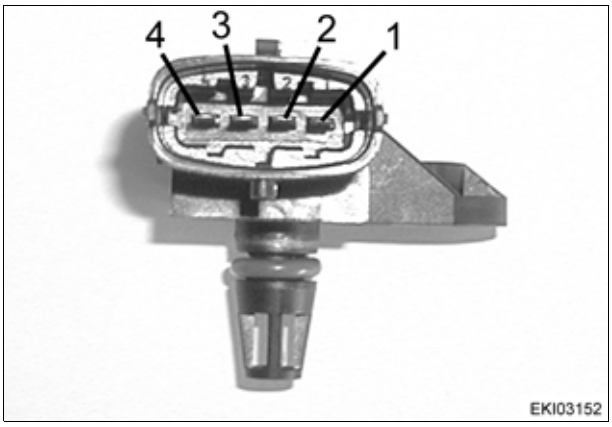

Fig. 23. I005051

Duty:
Component **B092** - Sensor, charge air pressure/temperature reports the boost pressure and charge air temperature to the **A051** - ECU, engine control unit (EDC 7).

The **B092** - Sensor, charge air pressure/temperature is a combination sensor. Two sensors with a shared power supply are mounted in the same component

Function of the pressure sensor:
The charge pressure (physical variable) is converted into a voltage signal (electrical variable). The pressure and the signal voltage are proportional, so that as the charge pressure increases, the signal voltage increases proportionately. ("LDA function")

Function of the temperature sensor:
The resistance of the temperature sensor changes depending on the temperature. The sensor has either an NTC (negative temperature coefficient) or a PTC (positive temperature coefficient) characteristic.

The **B092** - Sensor, charge air pressure/temperature is an NTC sensor, i.e. as the temperature rises, the resistance of the sensor falls.

Circuit diagram of the B092 charge air pressure/temperature sensor

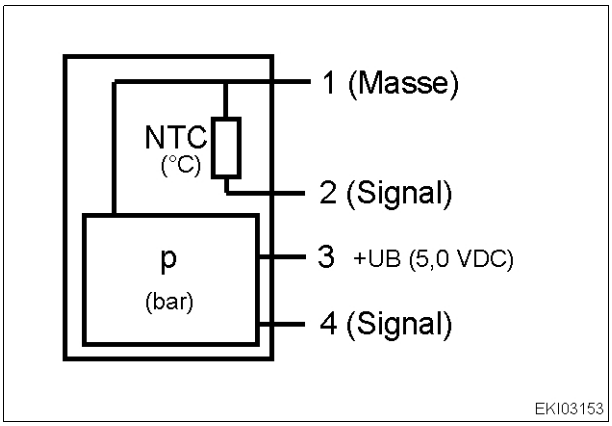

Fig. 24. I005052

Duty:

Used for controlling the engine (A051 - ECU, engine control unit (EDC 7).)
The **B092** - Sensor, charge air pressure/temperature picks up the boost pressure and the charge air temperature.
The signals are forwarded to the **A051** - ECU, engine control unit (EDC 7)..
In the **A051** - ECU, engine control unit (EDC 7)., the boost pressure is used to control the engine ("LDA function").

For charge air temperature warning message (on the A007 - Instrument panel)
The **A051** - ECU, engine control unit (EDC 7). picks up the charge air temperature from the **B092** - Sensor, charge air pressure/temperature and forwards it to the A050 ECU, basic control unit via the G BUS.
The "Warning threshold" for the charge air temperature is stored in the A050 ECU, basic control unit.
If the charge air temperature rises above the "warning threshold", the **A050** - ECU, basic control unit issues an error message.
The error message is sent to the **A007** - Instrument panel via the K BUS and appears on the display.

NOTE: *see §84*
*The **B092** - Sensor, charge air pressure/temperature can be read using the Deutz "SERDIA" diagnostics program.*

13 Starter control

On the FENDT 900 COM III series, as on all other COM III tractors, the starter is controlled by means of the **A051** - ECU, engine control unit (EDC 7)..

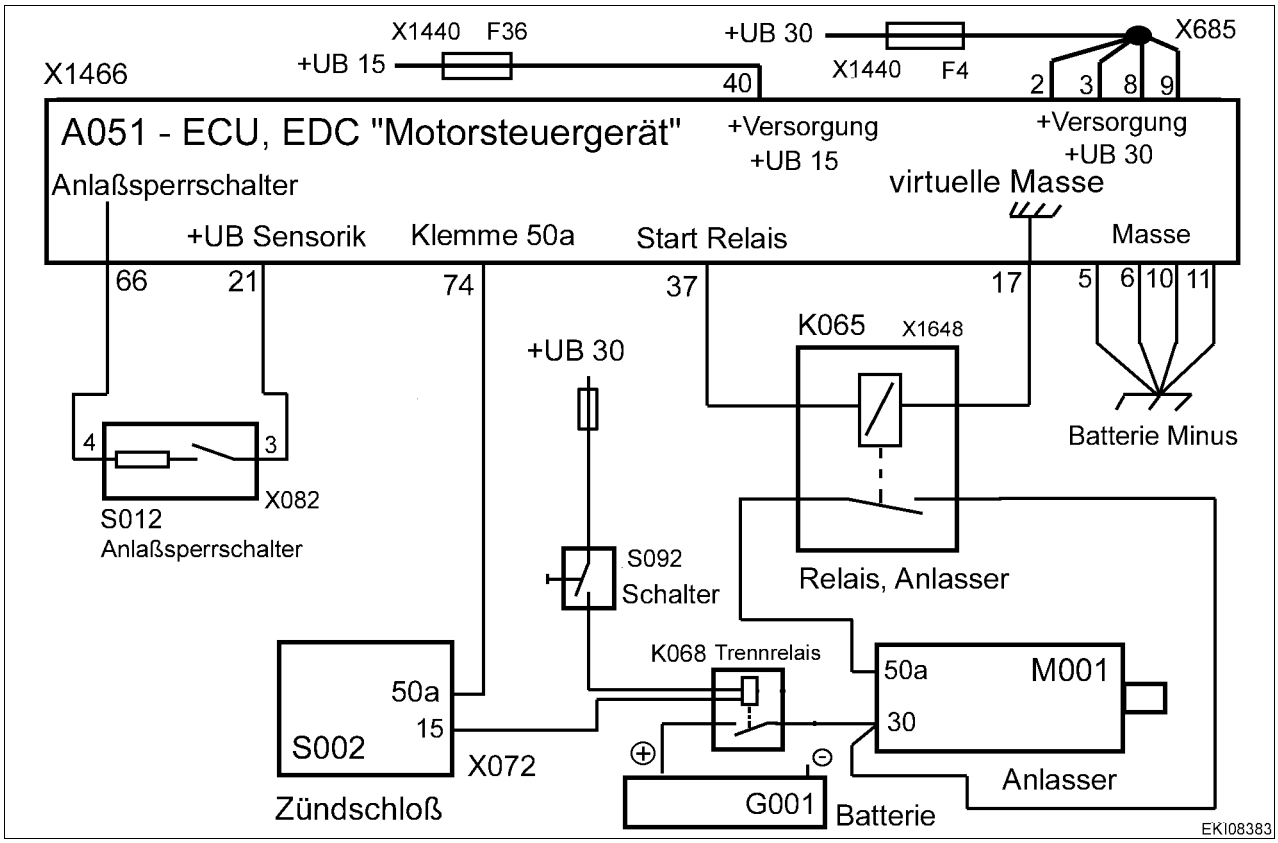

Fig. 25. I007332

When all input signals are present, the **K065** - Starter relay is energised by the **A051** - ECU, engine control unit (EDC 7)..

Start signals include:

- Supply voltage at terminals 30, 15, 31
- **S012** - Switch, starter lockout +UB at pin 66
- **S002** - Switch, ignition terminal 50a +UB at pin 74

During the start process, the **A051** - ECU, engine control unit (EDC 7). also requires the **following signals:**

- Start quantities released by the immobiliser control unit via the G bus
- A speed signal from the **B085** - Camshaft speed sensor or the **B088** - Crankshaft speed sensor

NOTE: *If the **A051** - ECU, engine control unit (EDC 7). does not detect a speed signal after about 5 seconds, the start process is aborted.*

The start process is aborted for the following reasons:

- Without a speed signal, the **A051** - ECU, engine control unit (EDC 7). cannot classify the rotational speed of the engine, speed control
- Without a speed signal, the **A051** - ECU, engine control unit (EDC 7). cannot assign the injection time
- **B085** - Camshaft speed sensor TDC cylinder 1 ignition, or
  B088 - Crankshaft speed sensor TDC cylinder 1/6

14 starter.

Diagram: starter.

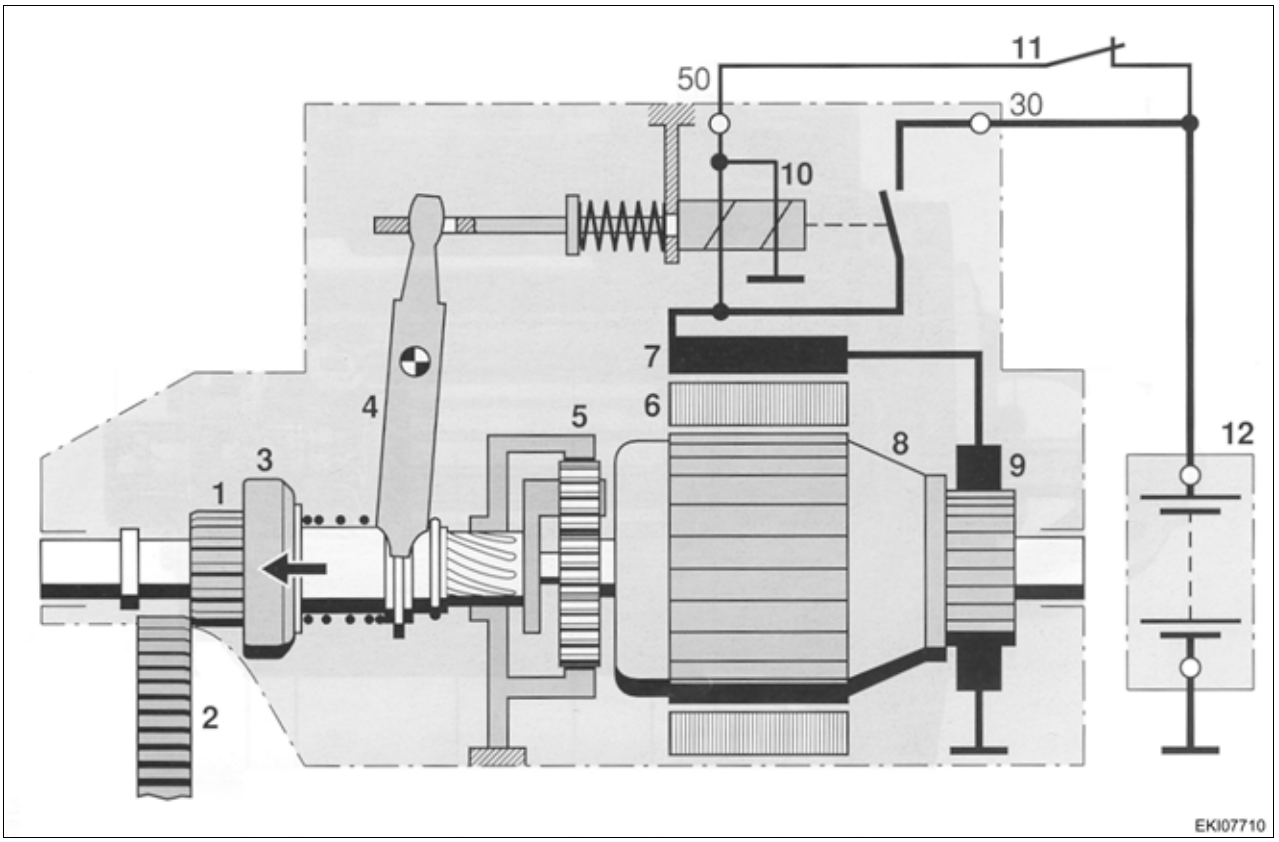

Fig. 26. I000762

Item	Designation	Item	Designation
1	Pinion	7	Exciter winding
2	Gear rim	8	Anchor
3	Roller-type freewheel	9	Commutator with carbon brushes
4	Engagement lever	10	Engagement relay with pull-in and hold-in winding
5	Planetary gear (reduction gear)	11	K065 starter relay
6	Pole shoe	12	G001 battery

Diagram: Reduction gear starter with free running pinion

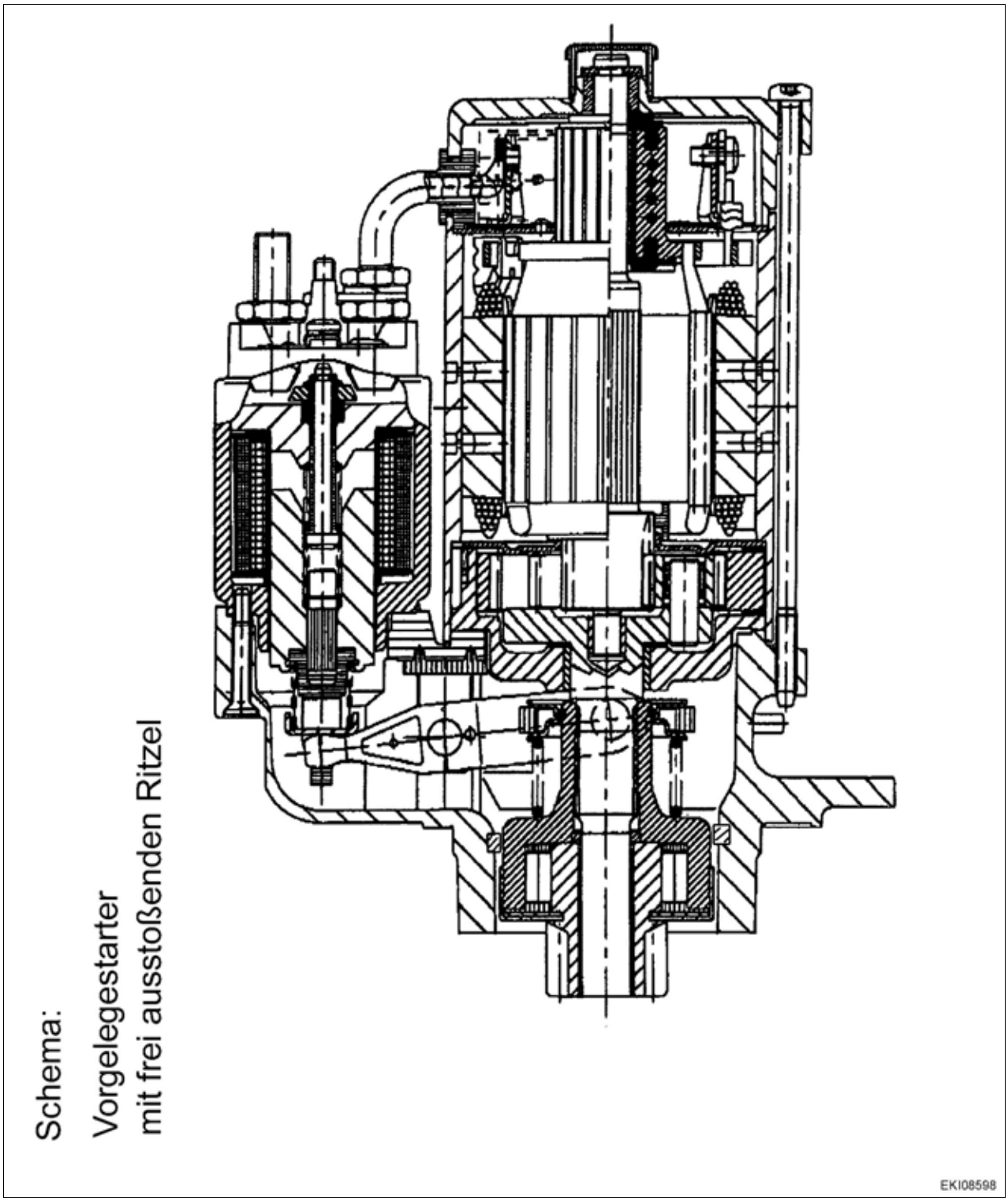

Fig. 27.

I002396

15 Calculating the fuel consumption of a diesel engine

NOTE: *See also:*
Service Information 23/2007 (PTO power and fuel consumption of the COM III tractor)

Rough calculation for the fuel consumption of a diesel engine operating under full load
The rough calculation produces an approximate value for the fuel consumption of a diesel engine
The fuel consumption depends upon the tractor engine horse power

Tractor type	Chassis no.	Engine horsepower (max. power ECE R24 KW/HP)	Fuel consumption under full load
FENDT 922 Vario	919 / .. / ...	162 / 220	**approx. 44 l/Rhr**
FENDT 924 Vario	922 / .. / ...	176 / 240	**approx. 48 l/Rhr**
FENDT 927 Vario	925 / .. / ...	199 / 270	**approx. 54 l/Rhr**
FENDT 930 Vario	928 / .. / ...	220 / 300	**approx. 60 l/Rhr**
FENDT 933 Vario	931 / .. / ...	242 / 330	**approx. 66 l/Rhr**
FENDT 936 Vario	934 / .. / ...	265 / 360	**approx. 72 l/Rhr**

Under full load (i.e. max. engine power = max. injection volume)

Cons. = Fuel consumption (l/hr)

l = Amount of fuel in litres

HP = Engine power in HP (1 HP = approx. 0.736 kW)

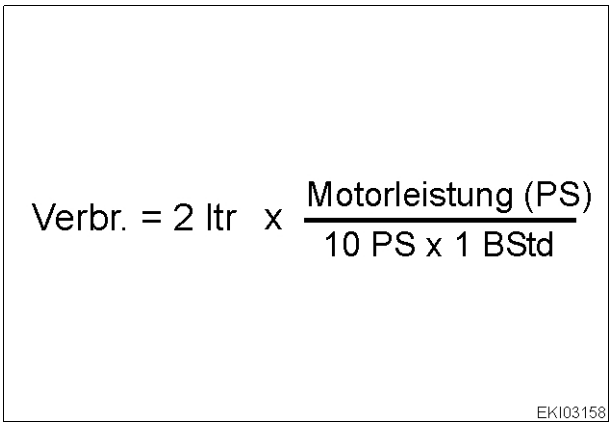

Fig. 28. I003105

Operating at maximum power (full load)
Fully depress foot throttle (B055 foot throttle sensor), accelerate the tractor using the joystick (A039 multifunction armrest) until the
engine speed reaches approx. 1800..1900 rpm. (Diesel engine running a maximum power)

Calculation example:

– Tractor power = 360 HP (max. engine power)

– Tractor operating under full load

Approx. fuel consumption per running hour = 2 l x (360/10) HP x 1 Rhr

Fuel consumption per running hour = approx. 72 l

Operating the diesel engine for optimum fuel consumption (l/Rhr)

Opt. = Economical operating level of the diesel engine

In the partial-load operating range = 2/3 of full load operating ("driving with reduced engine speed")

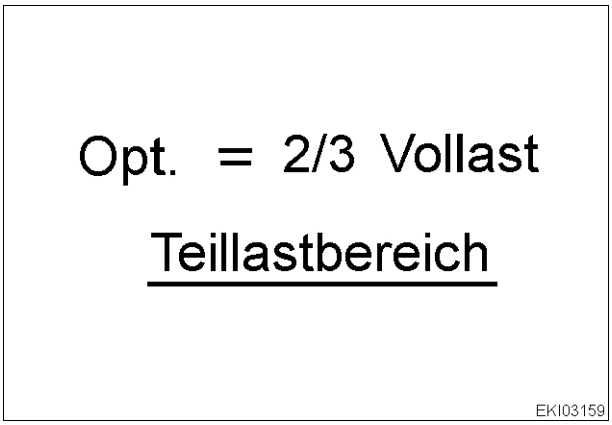

Fig. 29. I003106

Driving in the partial-load operating range of the diesel engine

Using the foot throttle (B055 foot throttle sensor), set the engine speed to approx. 2000 rpm, accelerate the tractor using the joystick (A039 multifunction armrest),
engine speed reaches approx. 1800..1900 rpm. (The diesel engine is running in the partial-load operating range)

Measuring fuel consumption with the Vario terminal (approx. value)

Press F5.

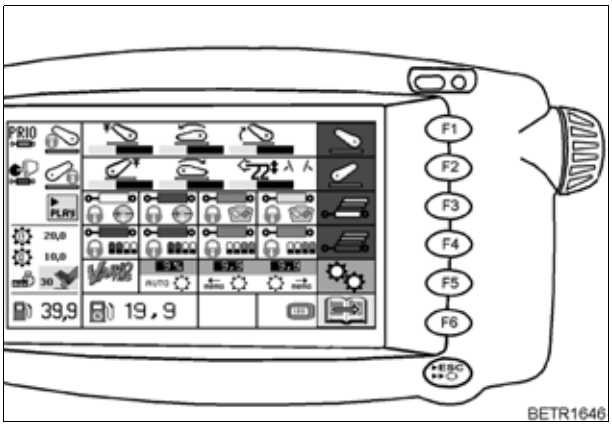

Fig. 30. I002750

The sub-menu is displayed.

Press F4.

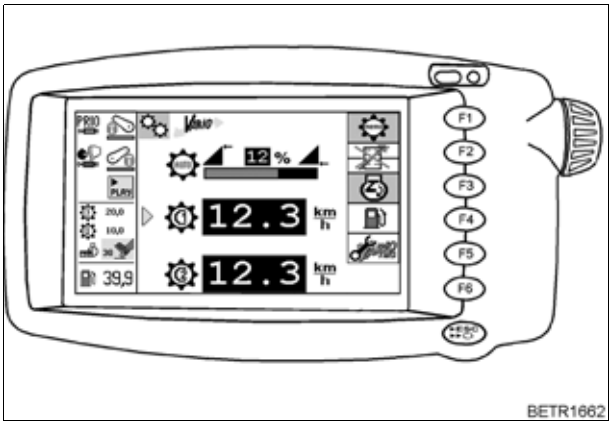

Fig. 31. I003103

The sub-menu is displayed.

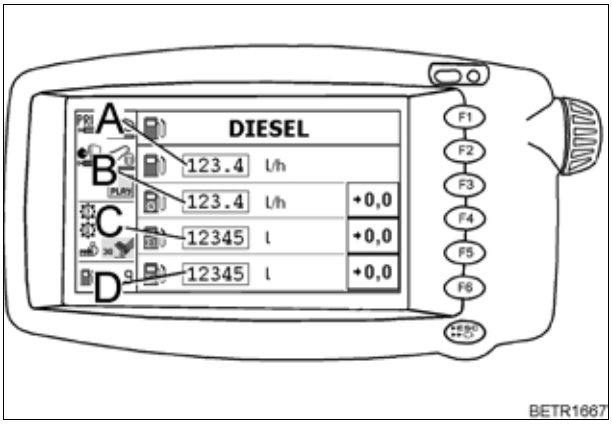

Fig. 32. I003104

A = Current fuel consumption

B = Average fuel consumption
Display is reset to "0"

C = 1st sum counter
For example between different driving styles for similar task
Display is reset to "0"

D = 2nd sum counter
For example between different driving styles for similar task
Display is reset to "0"

NOTE: *Maximum value for the sum counter is 30,000 litres, then measuring starts at 0 again.*

16 Belt drive: Deutz TCD 2013

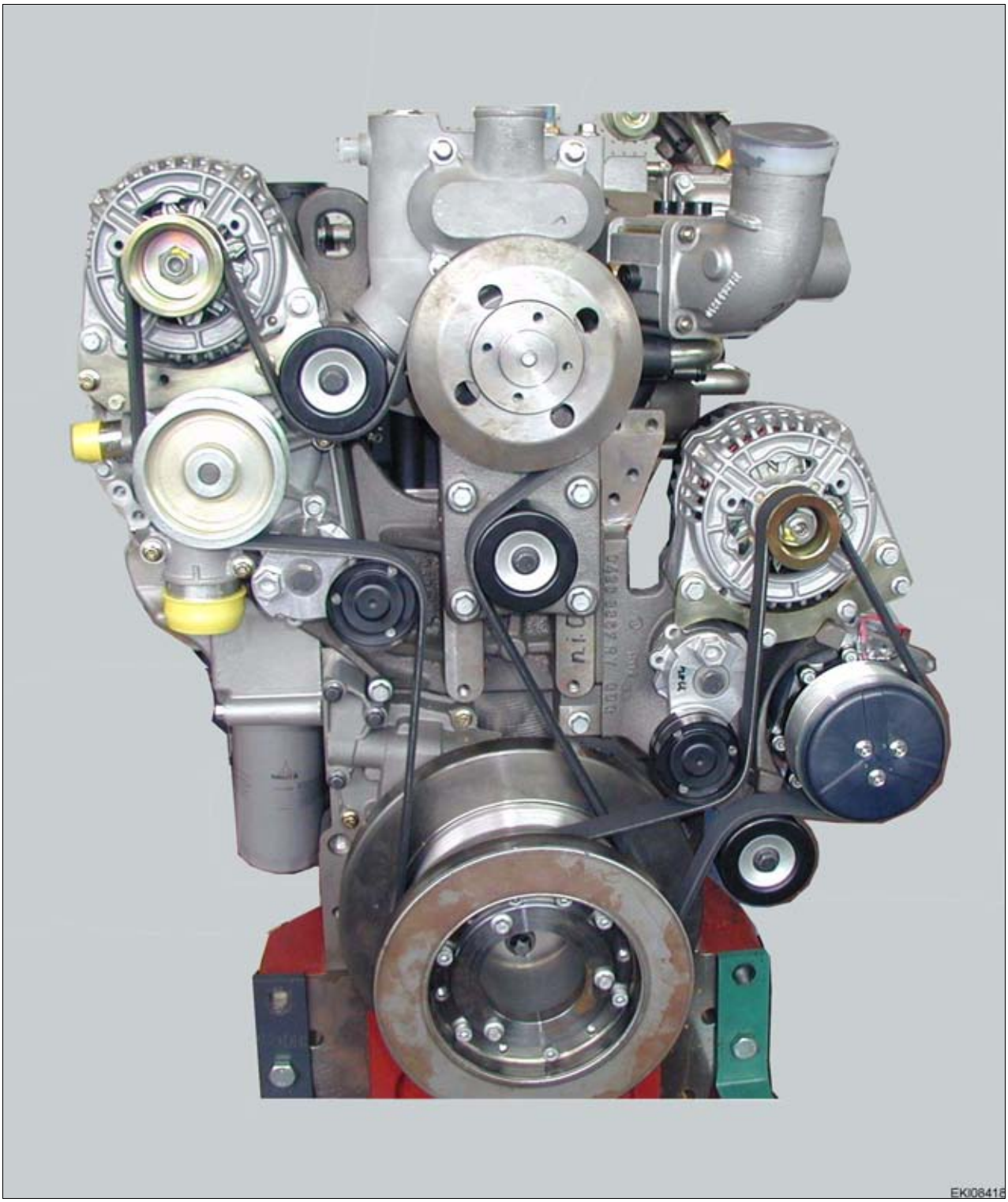

Fig. 33. I001732

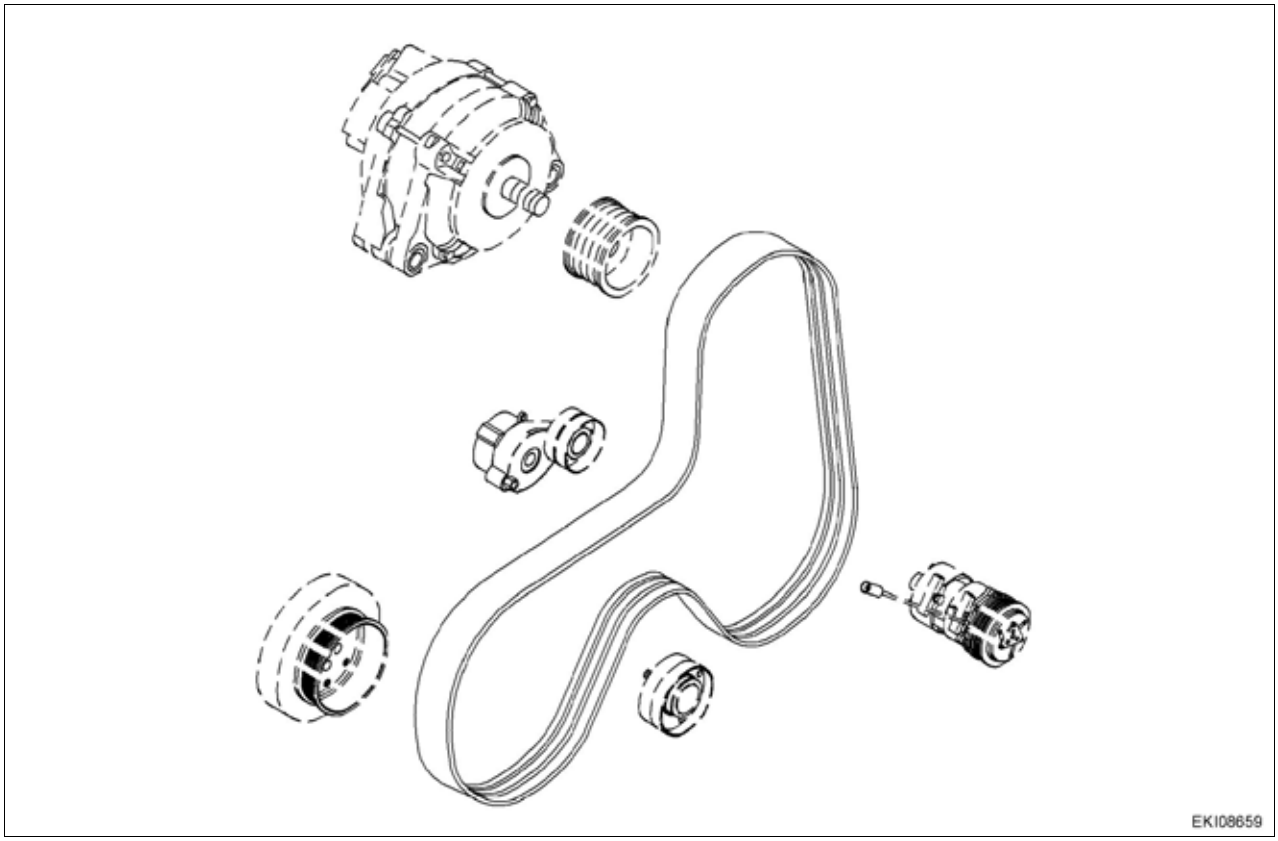

Fig. 34. I002538

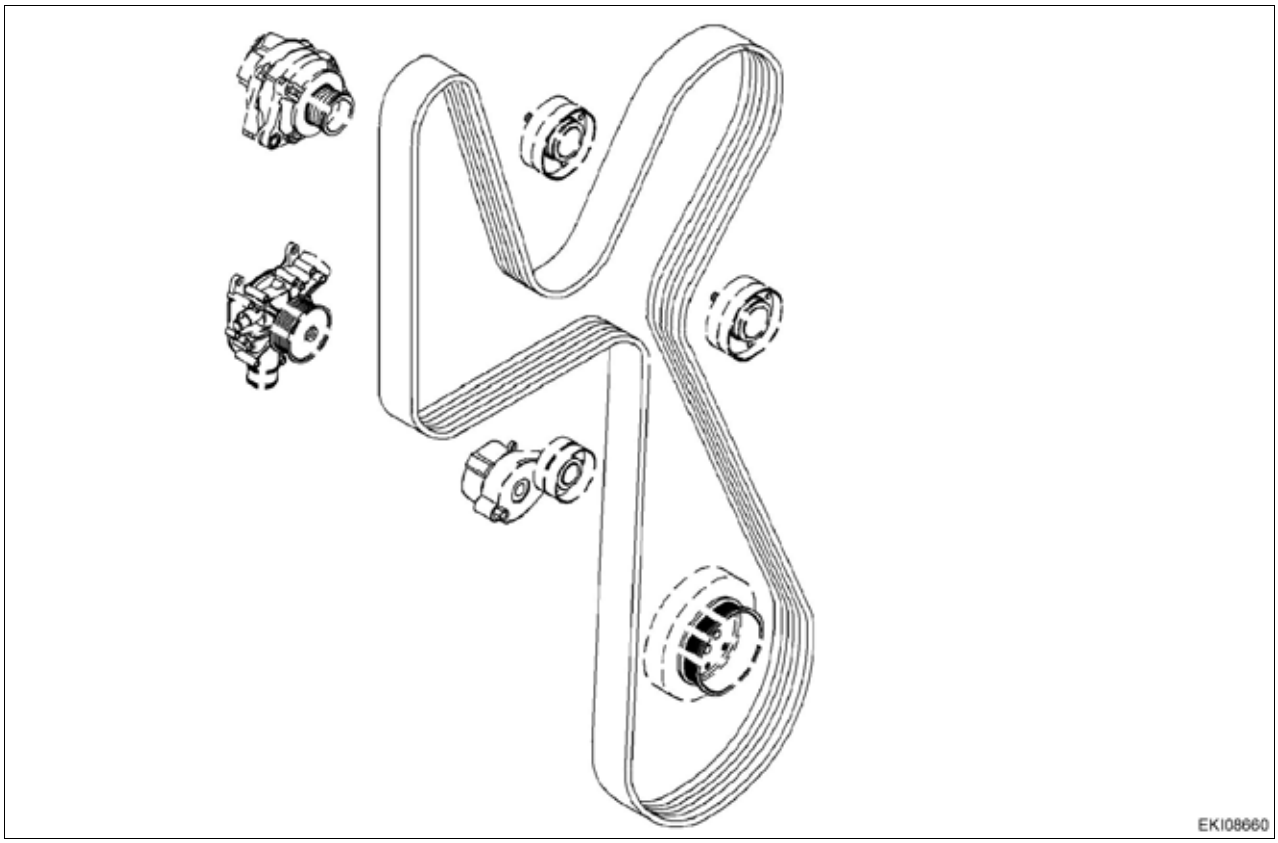

Fig. 35. I002550

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17 Air intake and exhaust routing: Deutz TCD 2013

Diagram: Air intake and exhaust routing

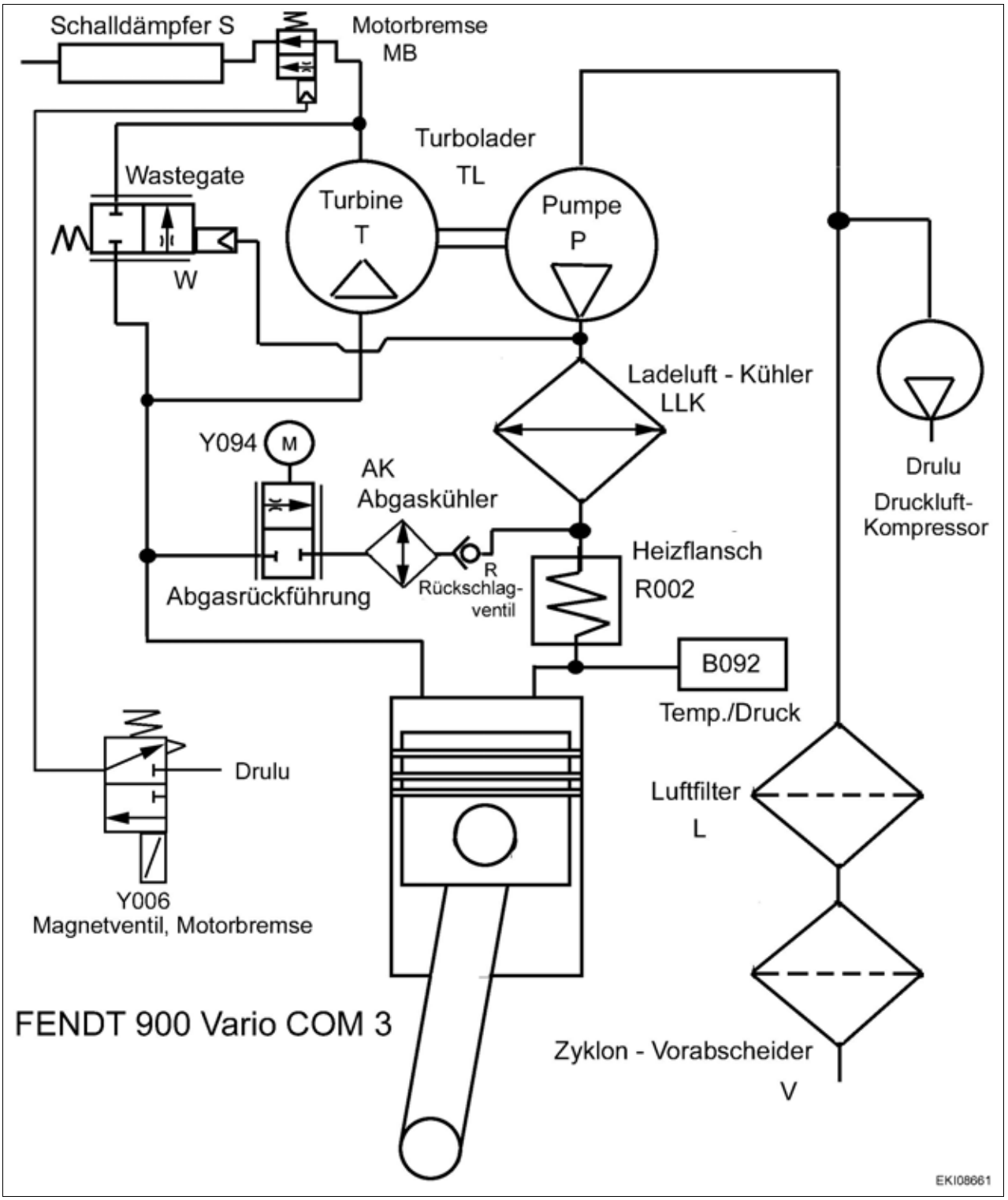


Fig. 36. I003270

Item	Designation	Item	Designation
V	Zyklon pre-cleaner	AK	Exhaust gas cooler
L	Air filter	R	Non-return valve
TL	Turbocharger (pump wheel P)	TL	Turbocharger (exhaust gas turbine T)
LLK	Intercooler	W	Wastegate (bypass valve)

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
R002	Heater flange **Note:** Chapter 9000 Reg. E – Measuring and testing R002 heater flange	S	Silencer
B092	Boost pressure/charge air temperature sensor **Note:** Chapter 9000 Reg. E – Measuring and testing B092 sensor	MB	Engine brake
Drulu	Air compressor	Y006	Engine brake solenoid valve
Y094	Exhaust gas recirculation actuator motor **Note:** Measuring and testing Y094 actuator motor		

Component position

Air filter with Zyklon pre-cleaner

NOTE: *See also:*
Chapter 2000 Reg.G – Cleaning air filter with Zyklon pre-cleaner

At top in engine compartment

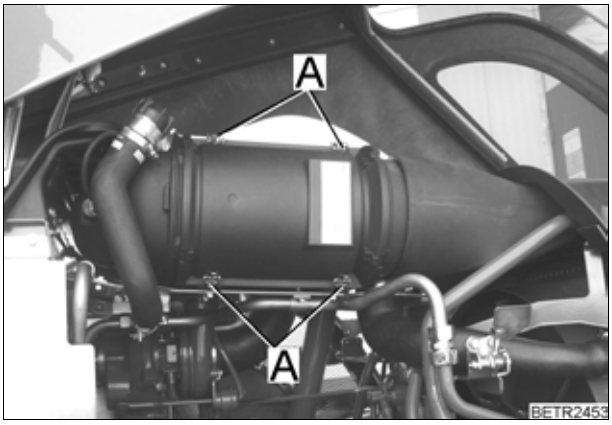


Fig. 37. I002563

Turbocharger (TL)
T = turbine wheel (exhaust side)
P = pump wheel (intake side)
Wastegate = bypass valve

At top in engine compartment

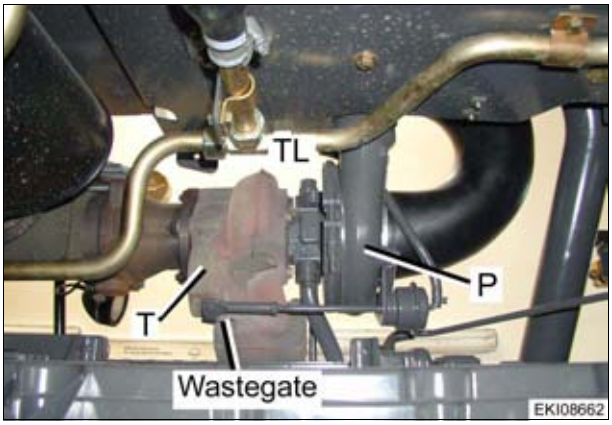


Fig. 38. I002582

Intercooler (LLK)

At the front of the cooler assembly

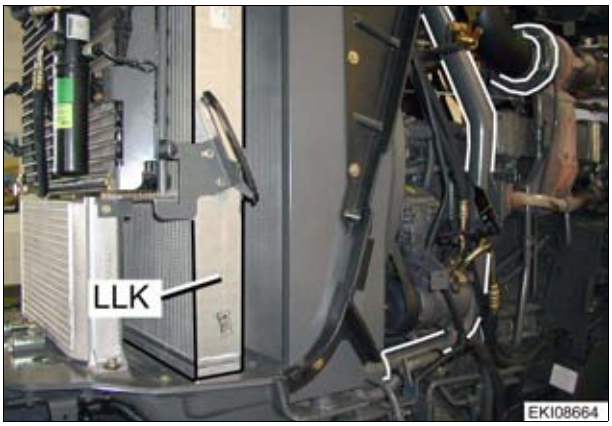


Fig. 39. I002584

R002 heater flange

The heater flange is activated at temperatures below 5°C .
It is preheated for approx. 1 minute.
Ignition on, preheat indicator lit
When the preheat indicator is extinguished, start the tractor ("Start readiness")

At the front of the engine

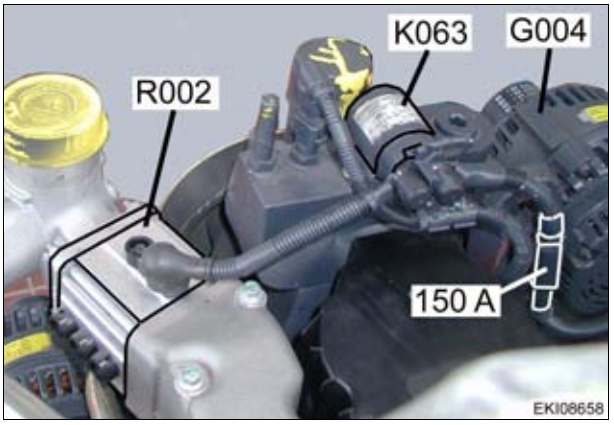


Fig. 40. I002531

B092 boost pressure/charge air temperature sensor

max. boost pressure = approx. 1.6 bar
max. temperature = approx. 110°C

At the intake pipe

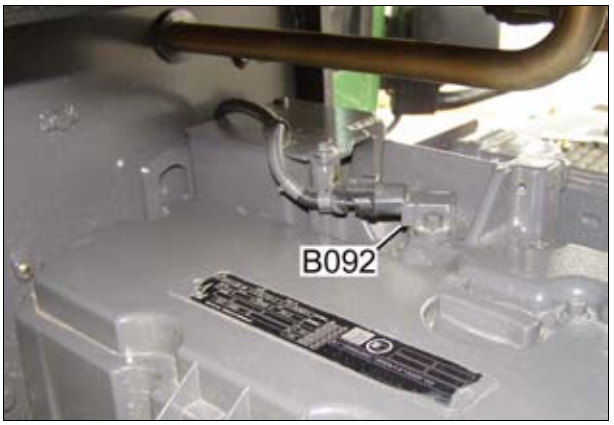


Fig. 41. I001089

Y094 exhaust gas recirculation actuator motor
A = open
Z = closed

The maximum exhaust recirculation rate is approx. 10% of the exhaust gas quantity

On the left of the engine

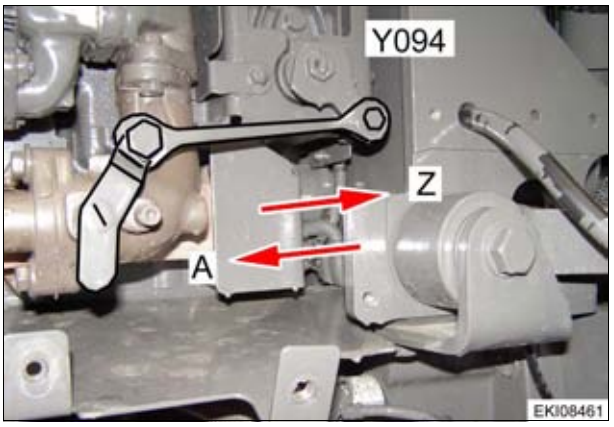


Fig. 42. I001846

Exhaust gas cooler for exhaust gas recirculation (water-cooled) (AK)
Non-return valve "chatter valve" (R)

On the left of the engine

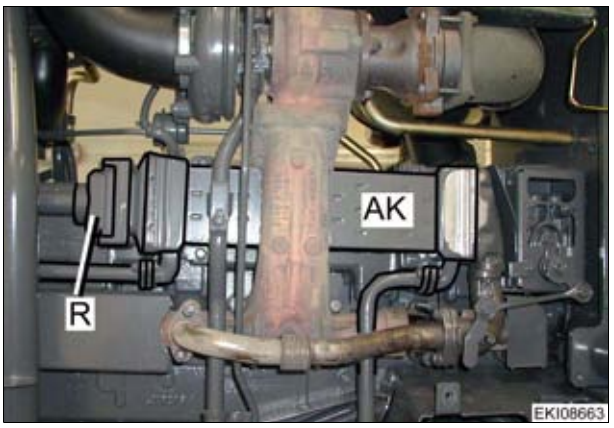


Fig. 43. I002583

Non-return valve "chatter valve" (R)

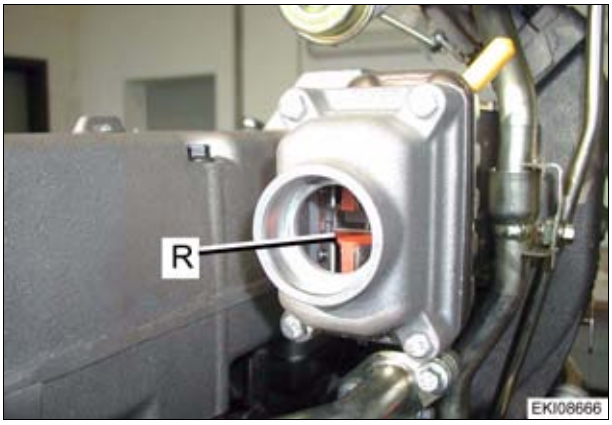


Fig. 44. I002586

Turbocharger (TL)
T = turbine wheel (exhaust side)
P = pump wheel (intake side)
Wastegate = bypass valve

At top in engine compartment

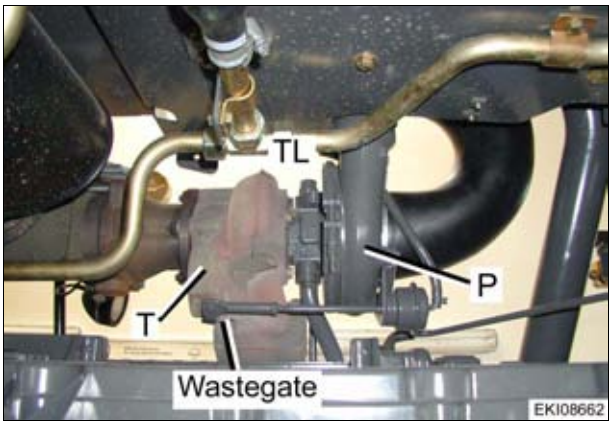


Fig. 45. I002582

Y006 solenoid valve, engine brake

At top in engine compartment, left side of engine

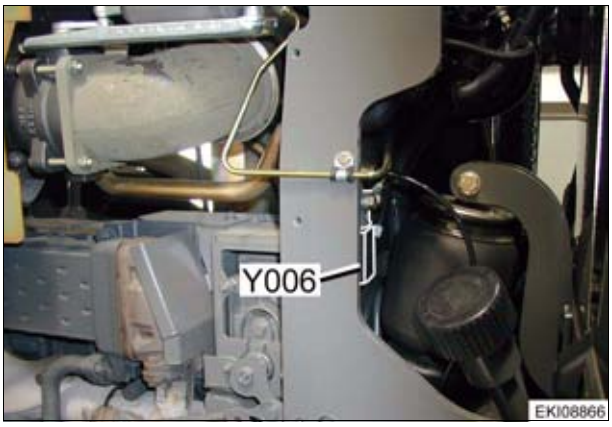


Fig. 46. I003264

Exhaust silencer (S)

On right side of cab

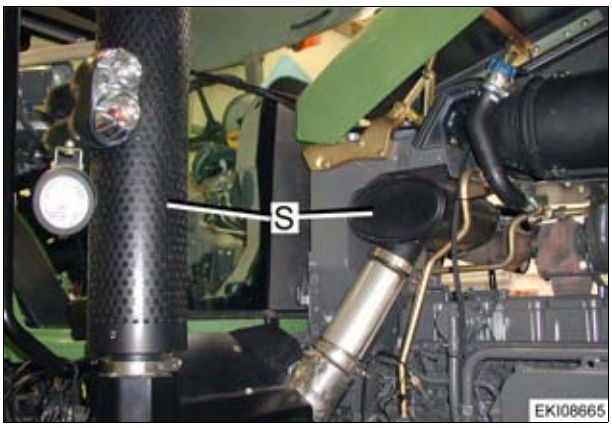


Fig. 47. I002585

Air compressor (Drulu)

On right of engine

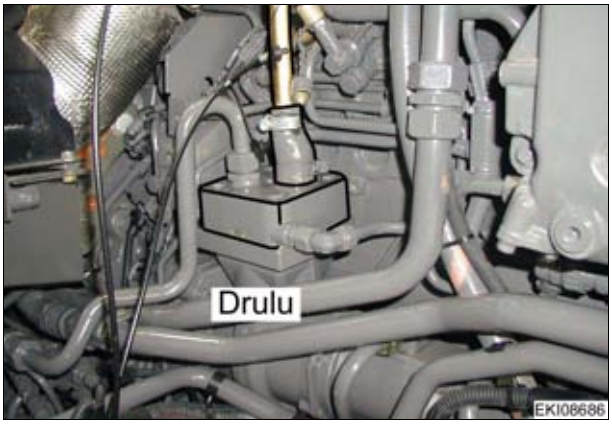


Fig. 48. I002607

Intake for the air compressor (Drulu)

At top in engine compartment

Fig. 49. I002608

18 Cleaning the air filter (with Zyklon pre-cleaner)

Function: Zyklon pre-cleaner

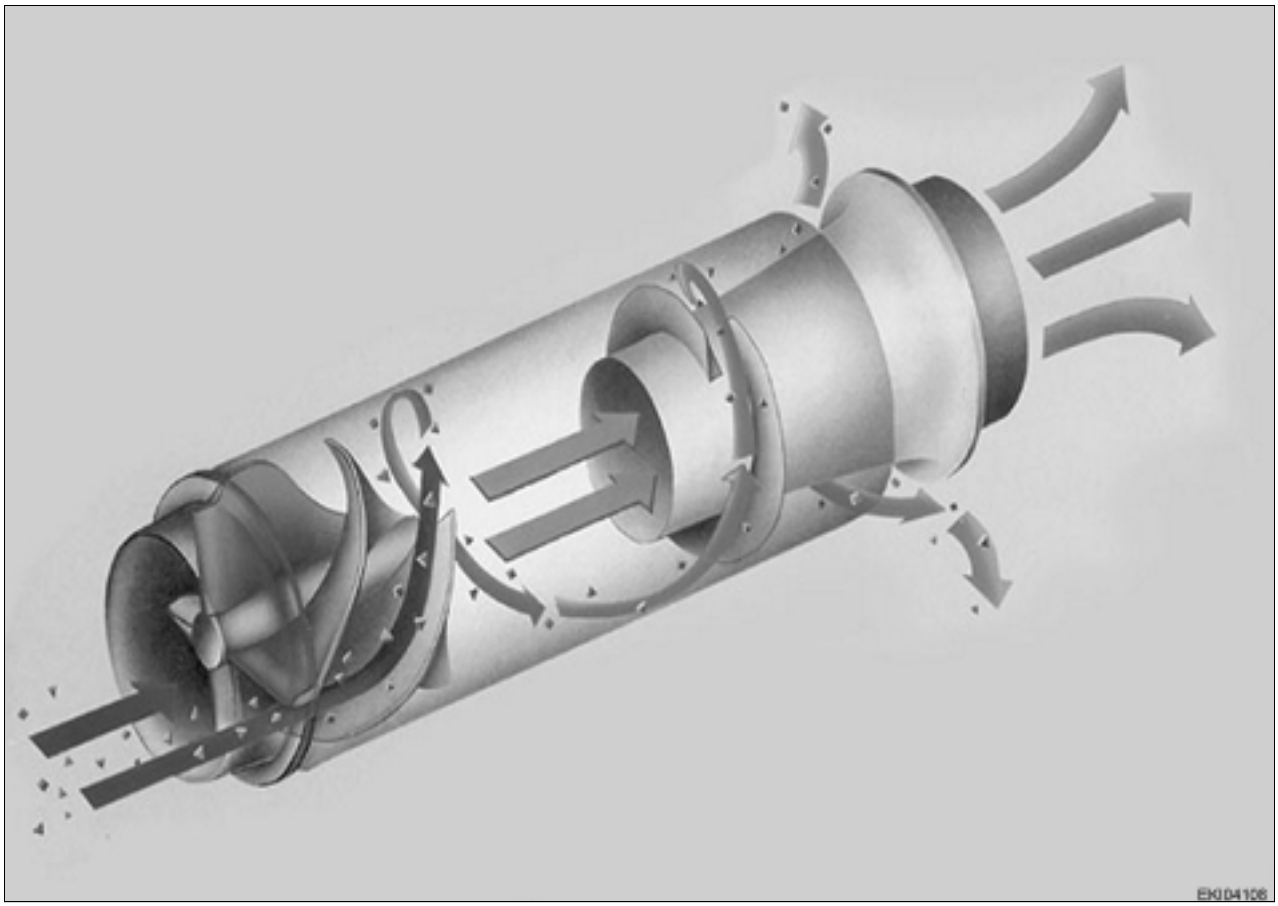


Fig. 50. I002567

Dust is extracted via the fan (arrow)

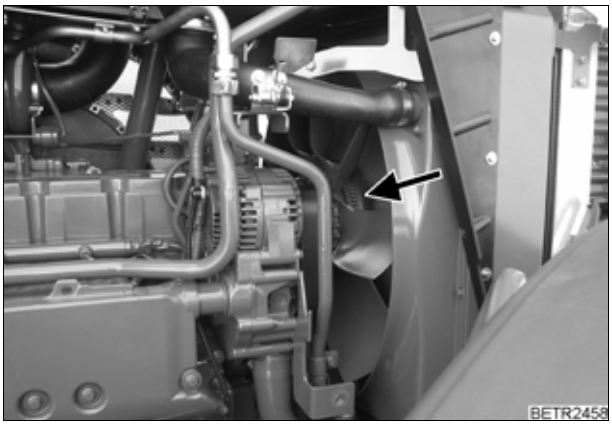


Fig. 51. I002568

Air filter

Replacing air filter
Open fasteners (A) and remove the cover

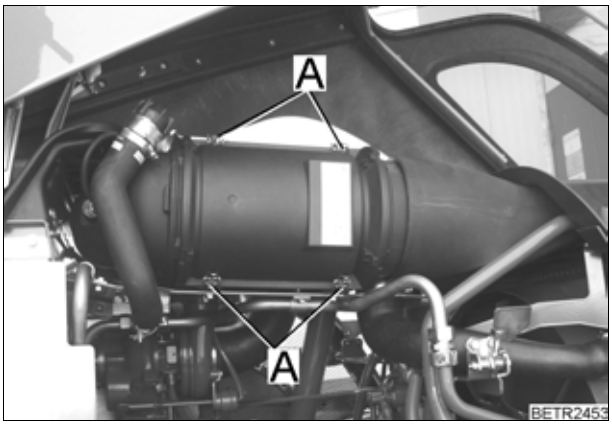


Fig. 52. I002563

Pull out main cartridge (A)
Clean filter housing and ensure sealing surfaces are free of defects

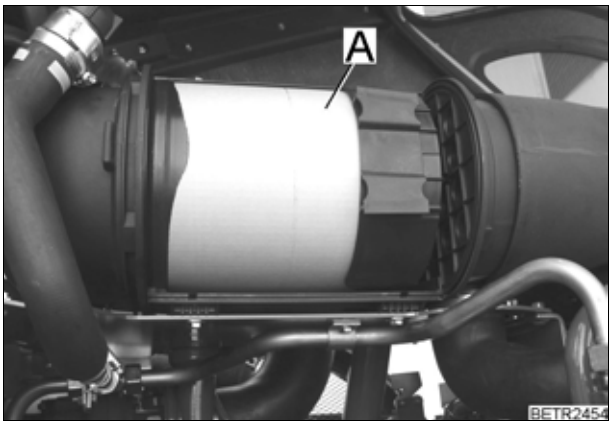


Fig. 53. I002564

Clean main cartridge (A)
Tap out the cartridge with the palm of the hand only

NOTE: *Check that the main cartridge (A) is in perfect condition after every cleaning!*
The main cartridge (A) must be replaced after 5 cleanings, or after 2 years at the latest!

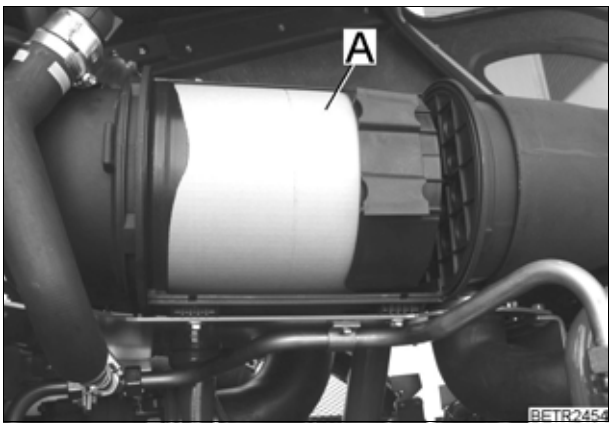


Fig. 54. I002564

The safety cartridge (A) must be replaced after the main cartridge has been replaced 3 times or if the main cartridge is damaged.

NOTE: *The safety cartridge (A) must only be replaced, not cleaned!*

Pull out safety cartridge (A).

NOTE: *Make sure that it is clean!*
The clean air duct must be kept free of dust particles!

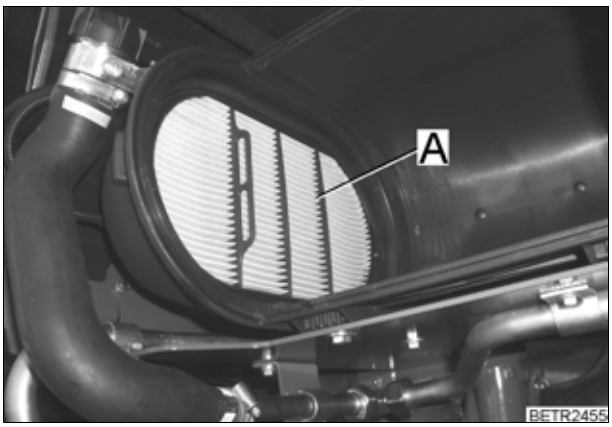


Fig. 55. I002565

Fit cover (A)

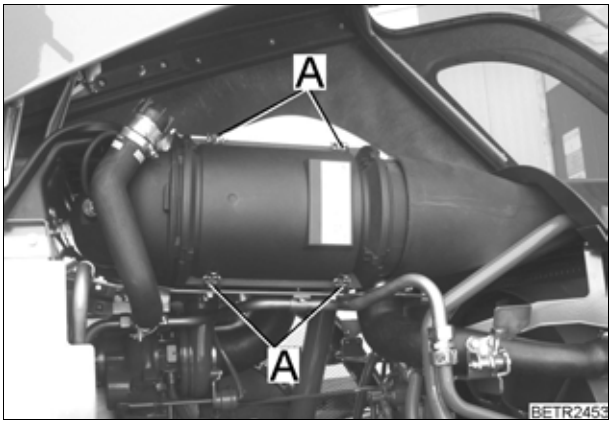


Fig. 56. I002563

19 Function: Turbocharger with wastegate (bypass valve)

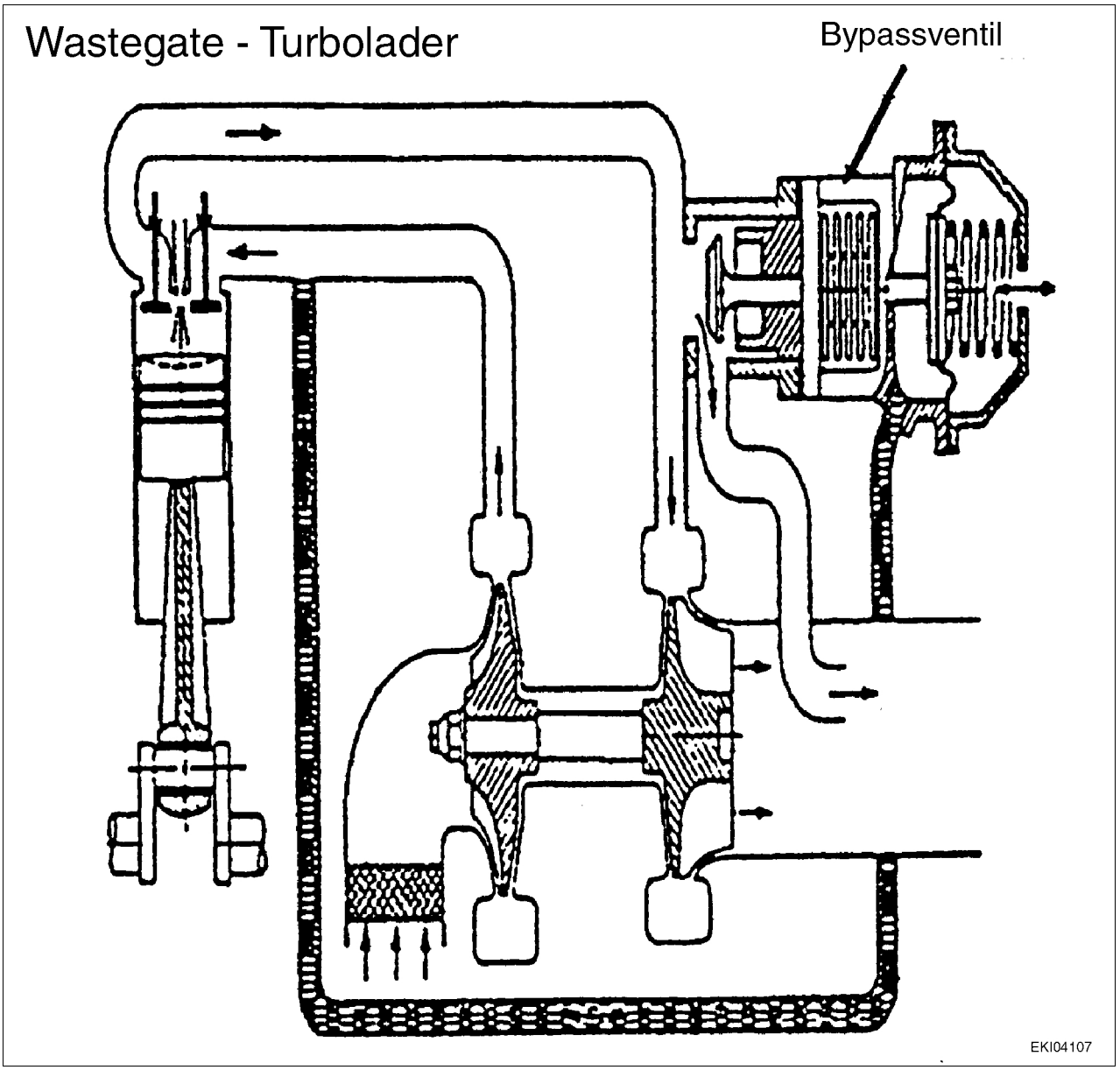


Fig. 57. I002590

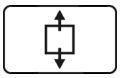
The diesel engine in the FENDT 900 Vario is fitted with a wastegate turbocharger.
Unlike a normal turbocharger, wastegate turbochargers are controlled by the engine speed.
This means that full boost pressure is reached as early as approx. 1100 rpm.
At higher engine speeds, the turbocharger controls back, i.e. the boost pressure is limited.
This limiting is made possible by a bypass valve, a connection between air intake and exhaust.
If the boost pressure exceeds a given limit, the bypass valve opens and part of the exhaust flows past the turbine and directly to the exhaust pipe.
The turbine accelerates no further.

NOTE: *To check maximum boost pressure:*
- Check level of engine oil
- Check level of coolant
- Drive tractor at operating temperature
- Put diesel engine under load using a dynamometric brake (the turbocharger builds up boost pressure)
- Max. boost pressure: see technical datasheets

20 A051 ECU, engine control unit (installing engine software)

A051 = **ECU, EDC engine control unit**

at the bulkhead, between engine and cab



Open bonnet.

The settings (engine power, engine cut-off speed, governor behaviour, engine configuration etc.) have been saved in the engine software (engine data record and operating software).
The engine software is installed on the A051 ECU, engine control unit

Fig. 58. I001150

WARNING: If the A051 ECU, engine control unit is programmed with engine software that does not match the chassis number, any claims under warranty will be invalid.

The person carrying out the programming is responsible for correctly carrying out the procedure and may be held liable if it is carried out incorrectly.

The chassis number and engine number of the tractor are stored in the A051 ECU, engine control unit, as is the Serdia adapter serial number.

If engine software that does not match the chassis number of the tractor is programmed, the tractor's immobiliser is activated. (i.e. the A051 ECU, engine control unit does not release an injection volume).

If an A051 ECU, engine control unit that does not match the tractor's chassis number is installed, the tractor's immobiliser is activated (i.e. the A051 ECU, engine control unit does not release an injection volume).

If a new A051 ECU, engine control unit is installed, it must be programmed with the engine software that matches the tractor.
The A051 ECU, engine control unit must then be taught to recognise the immobiliser.
Only new components that have not yet been activated can be taught in.
(See also: Chapter 9015 Reg.F – Teaching in B083 immobiliser control unit and/or A051 ECU, engine control unit.)

The following conditions must be met in order to be able to replace the engine software or load it for the first time in an A051 ECU, engine control unit:

Condition	Note
The programming procedure for the Deutz diagnosis program is protected by a password.	This password varies according to the Serdia adapter Read off the serial number of the Serdia adapter Example: SN:131467 Report the Serdia adapter serial number to FENDT Customer Service: **Telephone:** +49 8342 / 77 - 123 **Fax**: +49 8342 / 77 - 222 Fendt Customer Service will send you the valid password for the Serdia adapter
The most recent Deutz diagnostics program (SERDIA) must have been installed on the diagnostic computer (laptop)	Downloading SERDIA software from AGCONET: **Customer service - FENDT - Customer service - Downloads**
The engine software must be available.	- Request the engine software from FENDT Customer service (Tel.: +49 (0) 8342 / 77 - 123) - The engine software will be sent to you in a "zipped" compressed file. - "Unzip" the file and save it to a folder **Suggestion:** Select the tractor's chassis number as the name of the folder. - Save the folder in: **C:\Program Files\Deutz\Data**
Load the engine software onto the A051 ECU, engine control unit	Programming process: Please refer to the detailed description

Determine the SERDIA password
Read off the serial number (arrow) on the Serdia adapter.
Example: SN:131467

Request the SERDIA password from FENDT Customer Service
Telephone: +49 8342 / 77 - 123
Fax: +49 8342 / 77 - 222

Fig. 59. I006515

Connect the SERDIA adapter (level 3) to the X810 diagnostics socket

NOTE: *When programming, make sure that the laptop is connected to the mains power supply (220 V) or that there is sufficient power remaining in the laptop battery.*
If the laptop suffers a power failure during programming, the A051 ECU, engine control unit will crash!

NOTE: *The USB cable to the laptop should be no longer than 2 m.*
If the cable is longer than 2 m, this may cause interference when programming.
This interference may cause the A051 ECU, engine control unit to crash.

Fig. 60. I003168


Cab, on the right mudguard

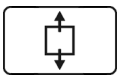

Remove cover.

Fig. 61. I003156

Open the Deutz diagnostics program (Serdia)

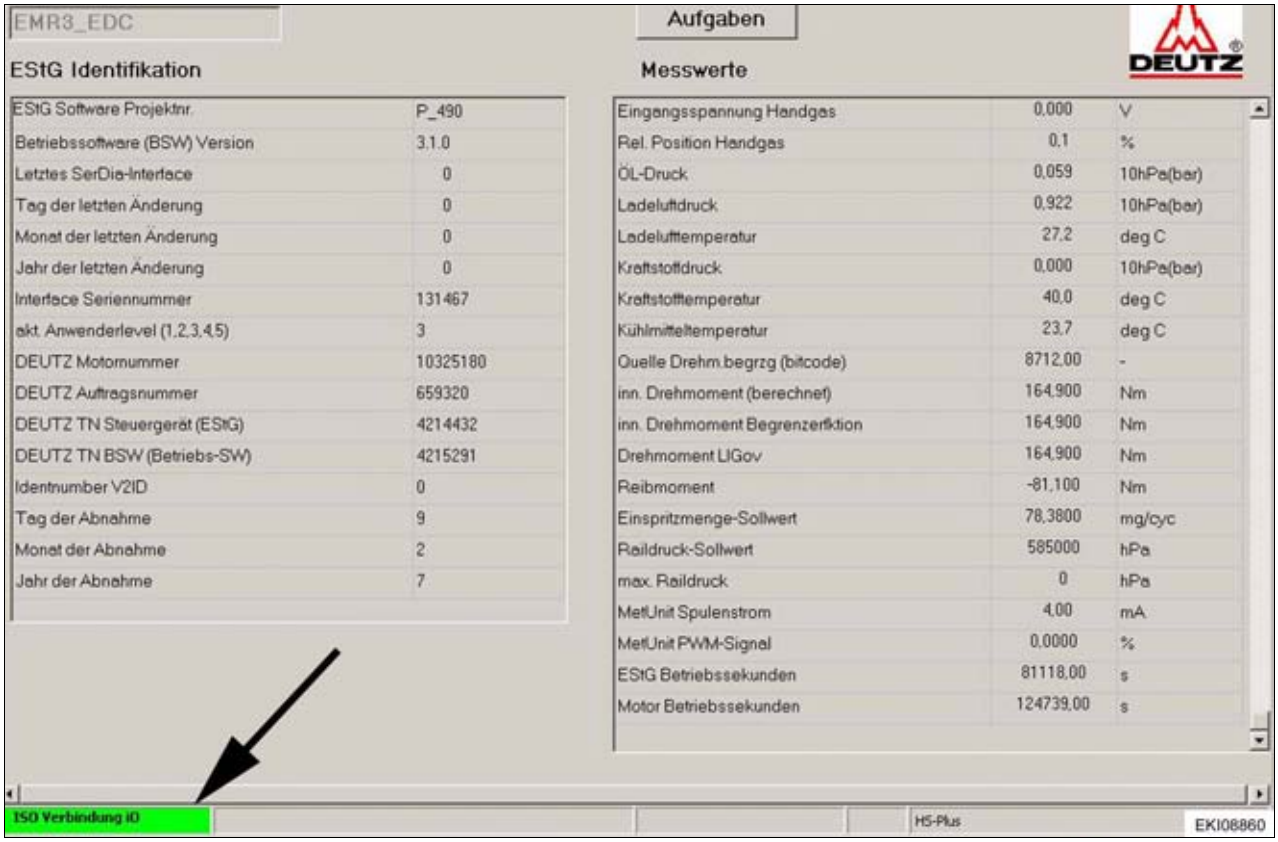


Fig. 62. I003157

Green bar = connection established between A051 ECU, engine control unit and laptop
Red bar = a connection has not been established between the A051 ECU, engine control unit and the laptop

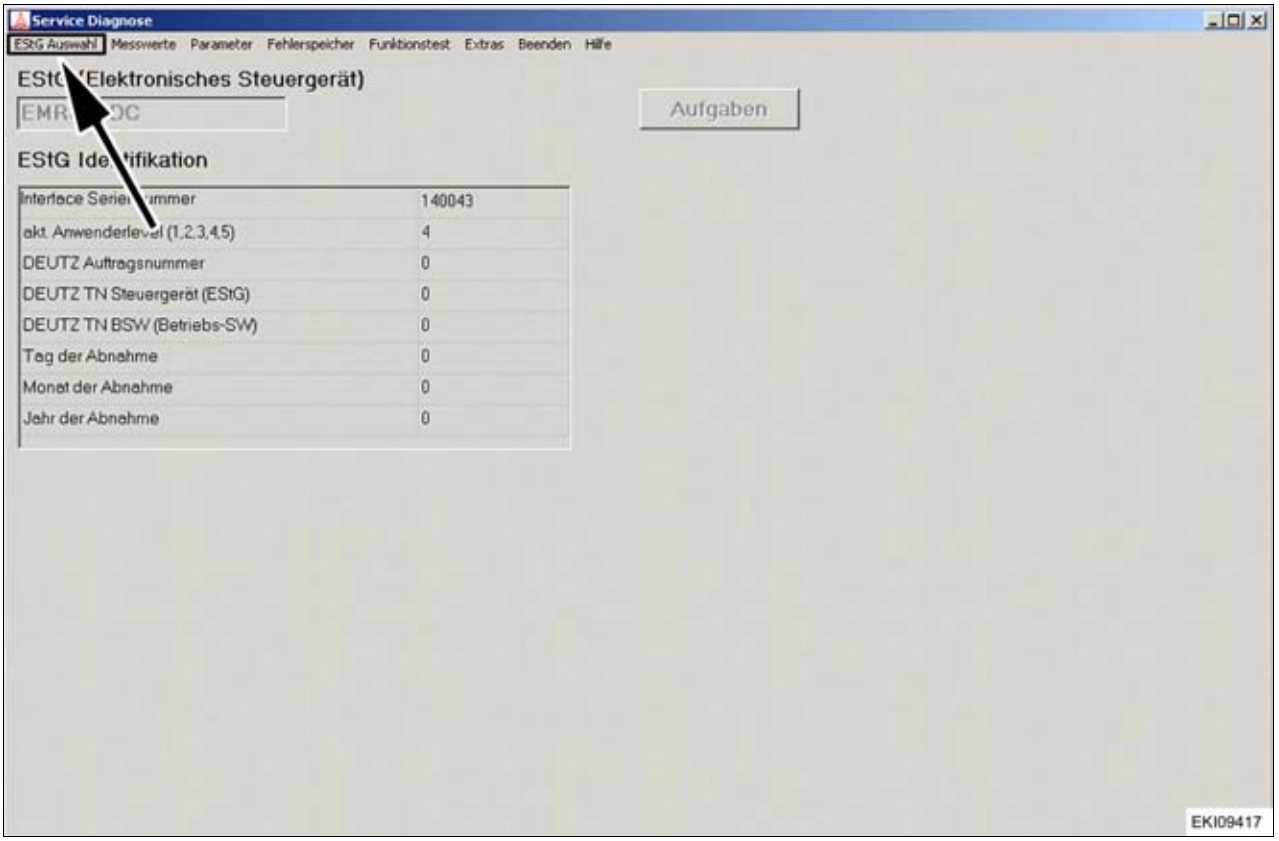


Fig. 63. I006506

Press the **ECU selection** button

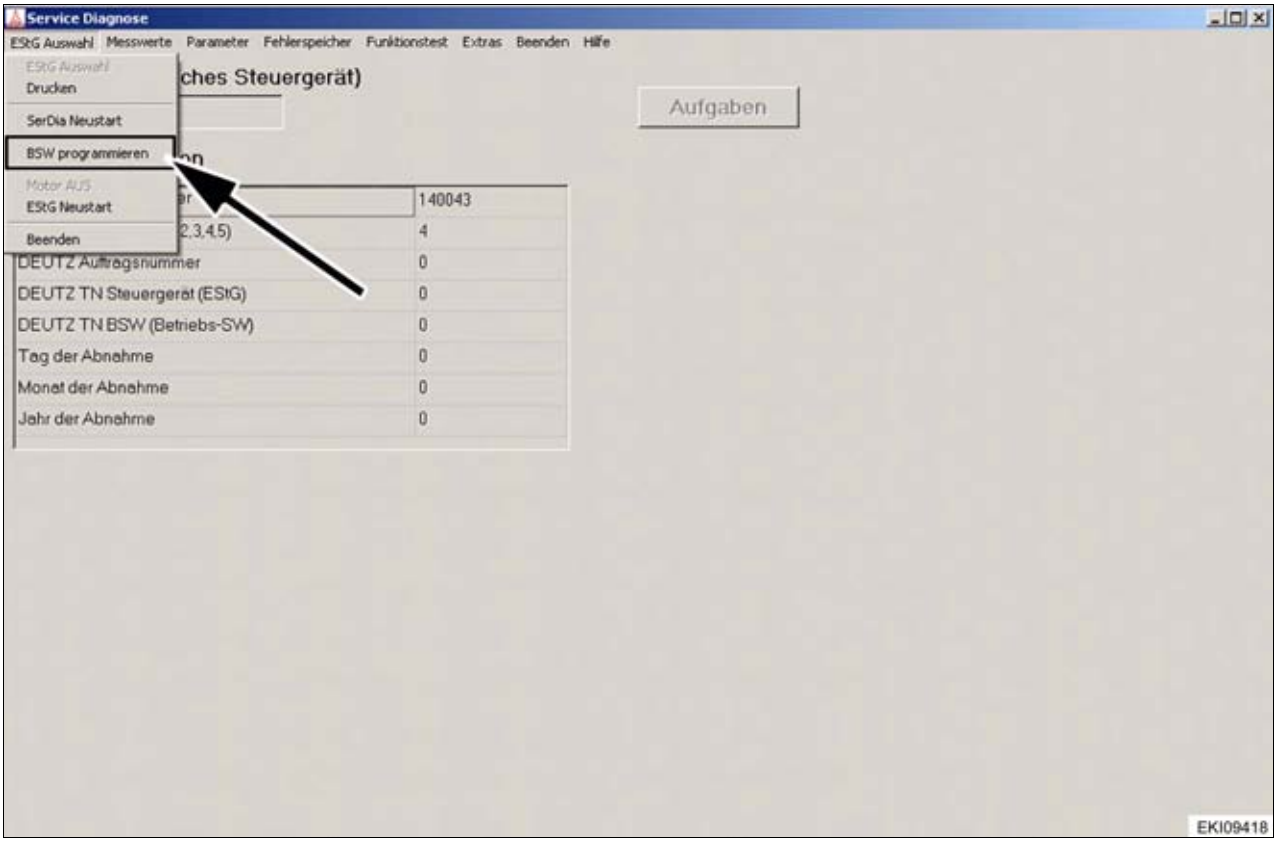


Fig. 64. I006507

Press the **Program ECU** button

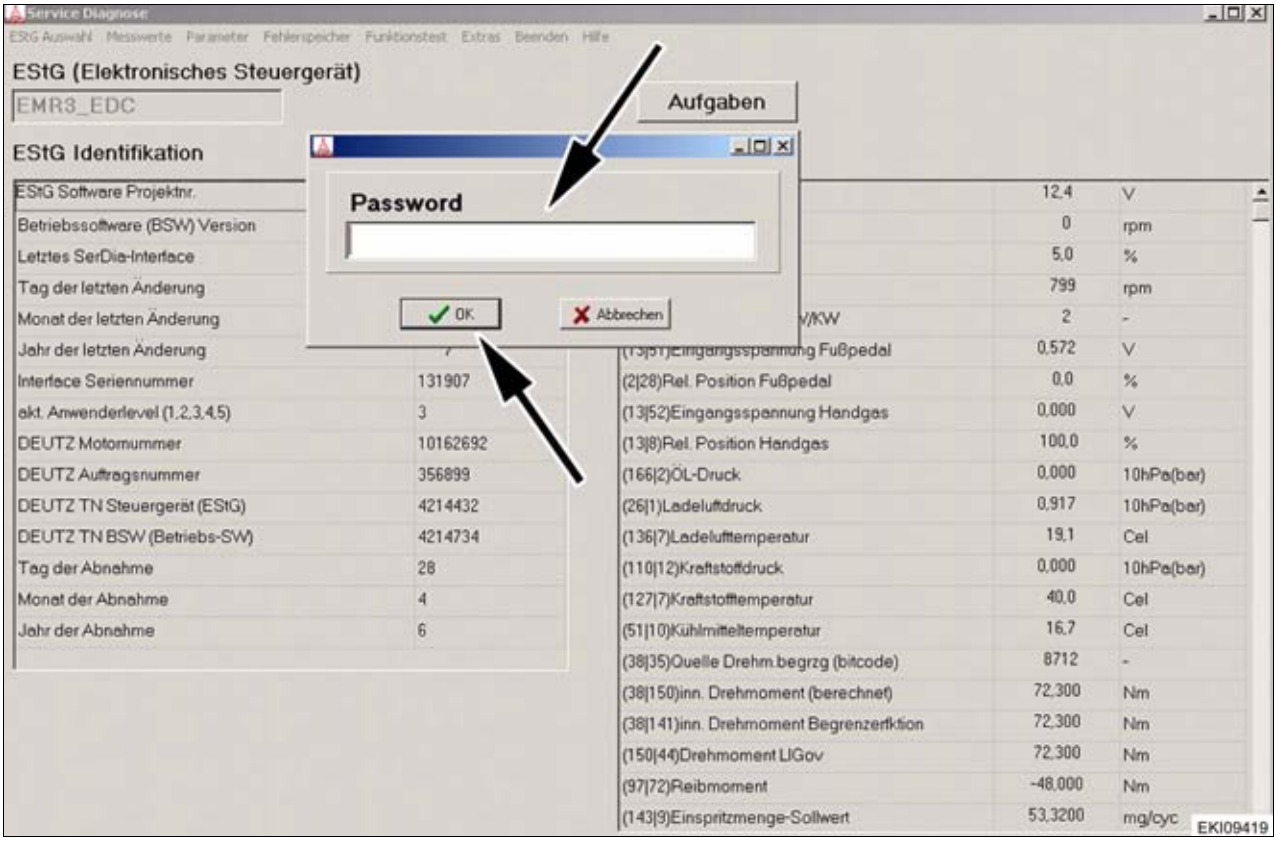


Fig. 65. I006508

Enter the **Serdia password** and confirm with **OK**

Example: 12345

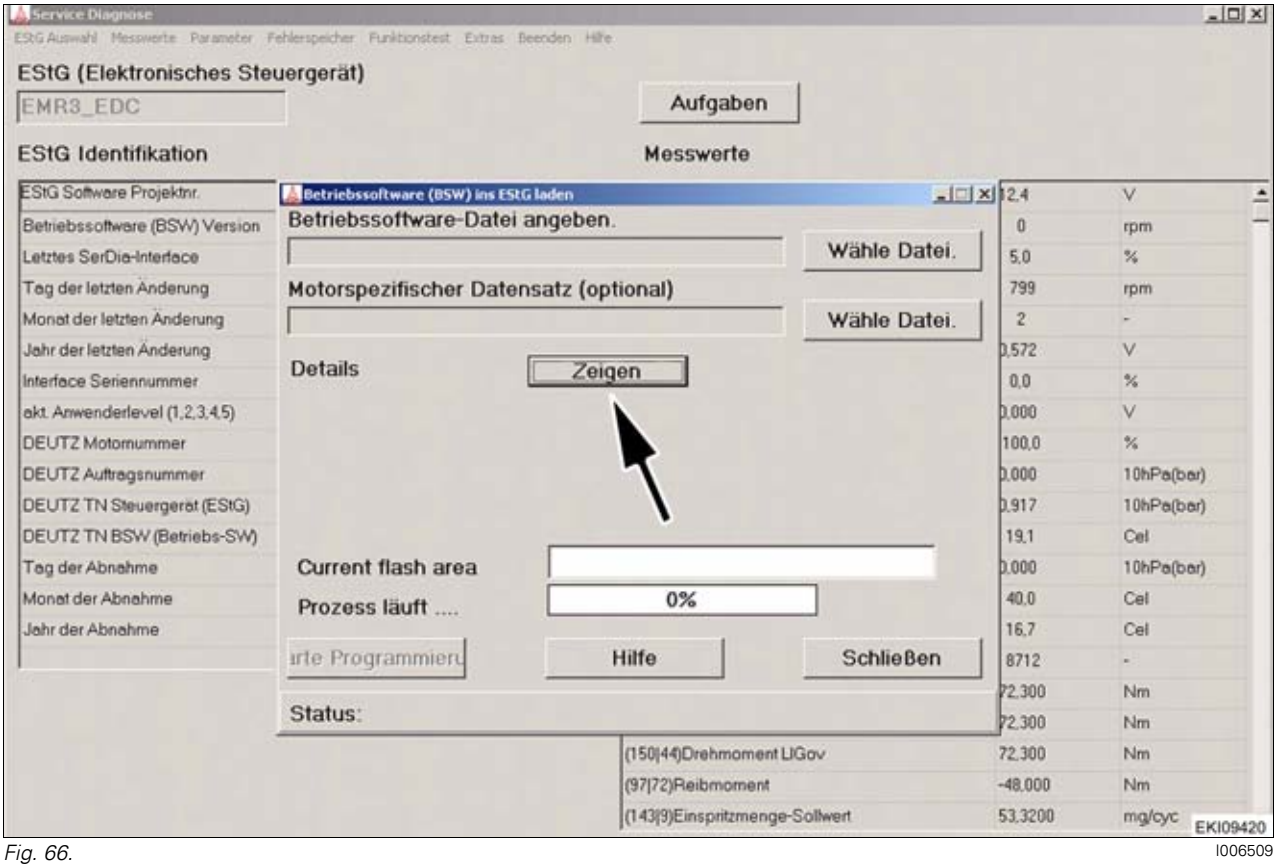


Fig. 66. I006509

Press the **show** button

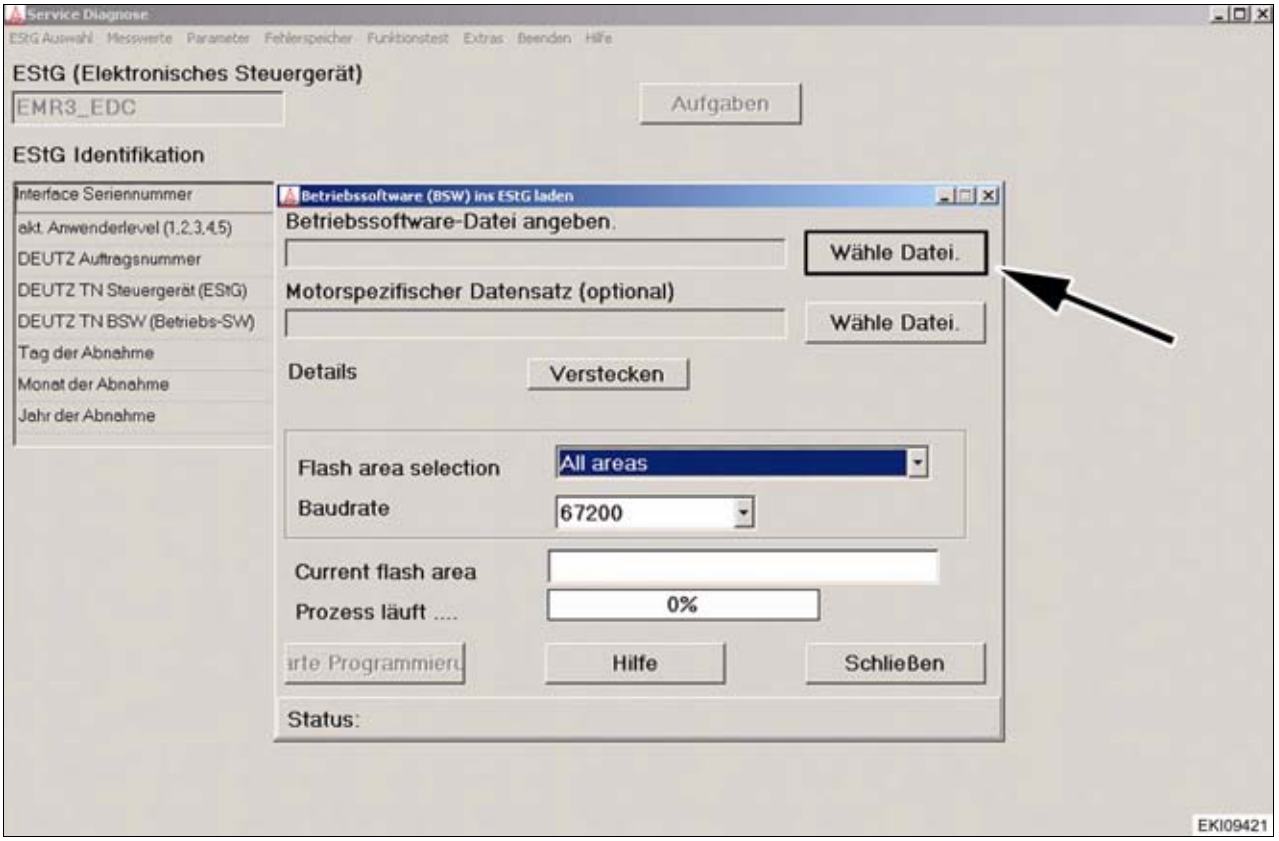


Fig. 67. I006510

The baud rate is displayed.
The baud rate must be set to **67200**.

The A051 ECU, engine control unit memory is displayed.
"Flash area selection"
This section must be set to "**All areas**".

Select with the "select file" button:

Operating software file:
With the operating software, the entire software package needed for operating the A051 ECU, engine control unit is loaded.

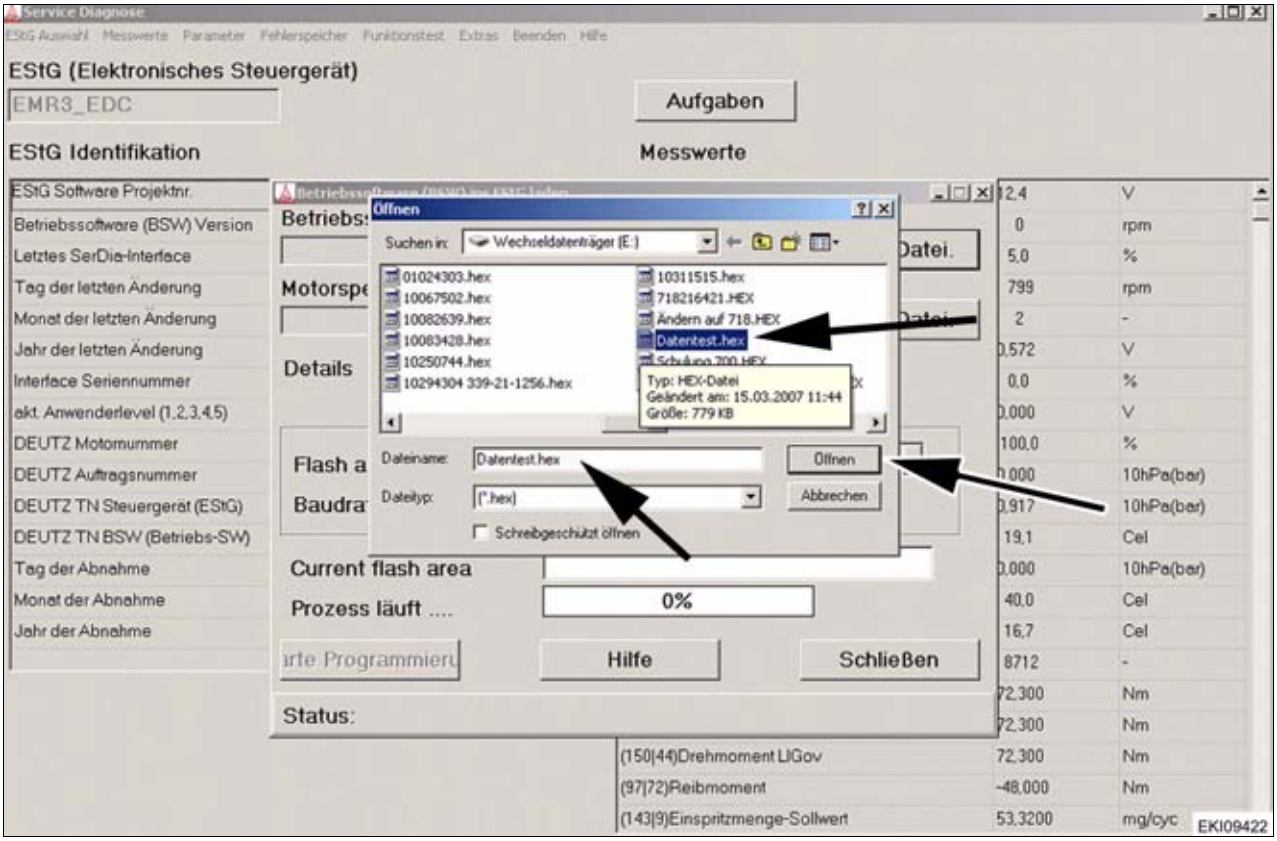


Fig. 68. I006511

Select the operating software file and open it.

Example:
C:\Program files\Deutz\Datachassis number.hex

NOTE: *Operating software:*
Type: Hex file
Size: Approx. 800 KB

Call up the operating software file with the **open** button.

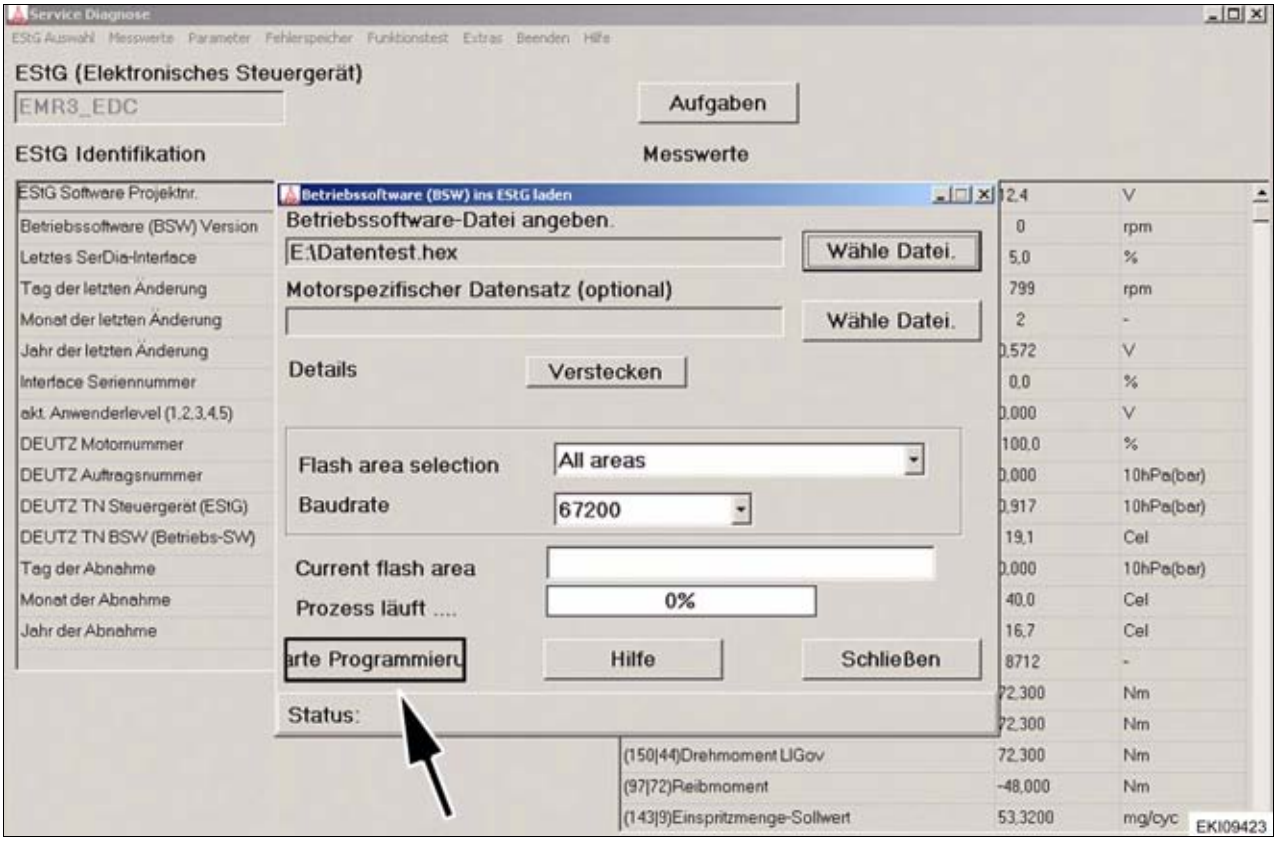


Fig. 69. I006512

Start the programming procedure with the **programming** button.

A few prompts may appear after this. Confirm these prompts with "OK".
After that, the programming routine will execute automatically.

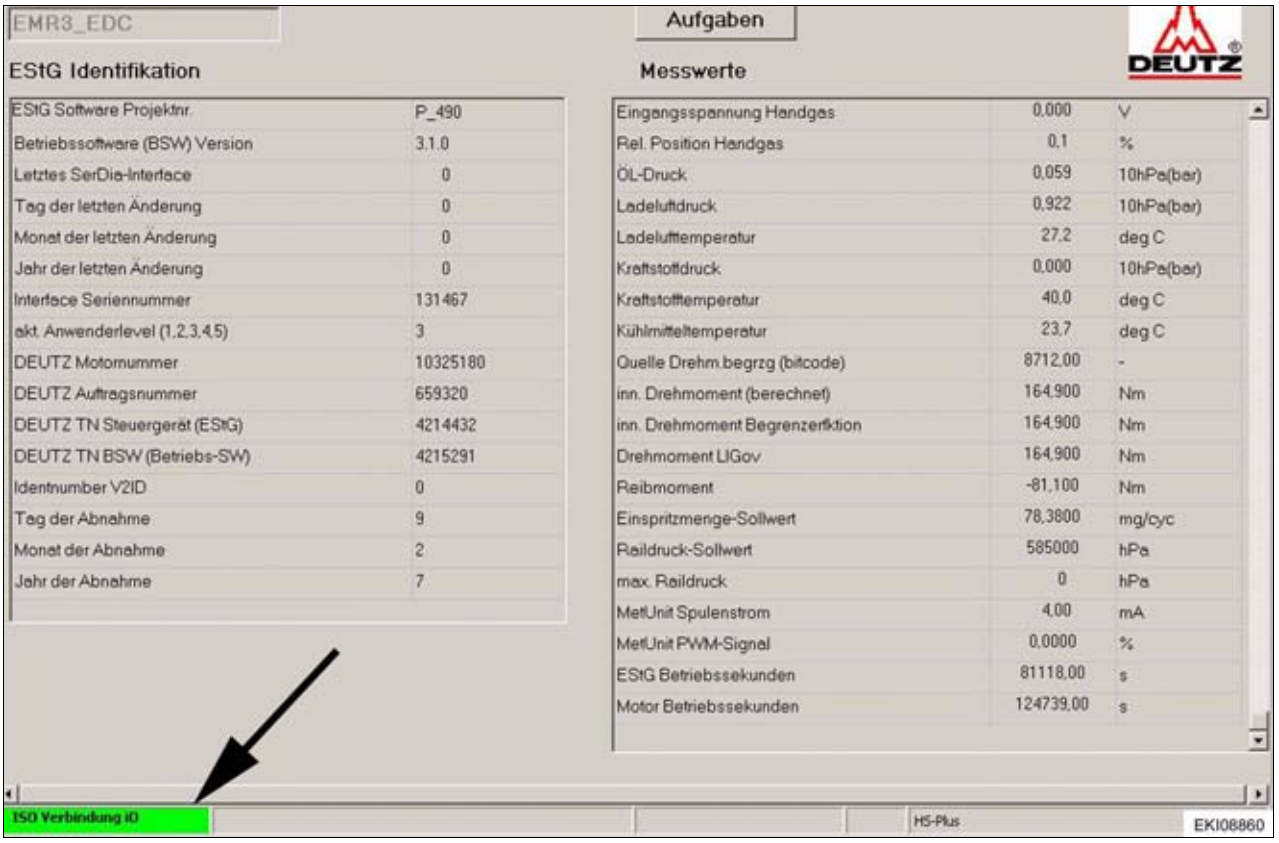


Fig. 70. I003157

When the operating software has been programmed successfully, the A051 ECU, engine control unit is read out again automatically.
This display (arrow) first turns red (the A051 ECU, engine control unit is powered down)
The display (arrow) then turns green again (the A051 ECU, engine control unit is powered up)

NOTE: *Wait until the display (arrow) is steady green again. Only then can the Deutz diagnostic program Serdia be shut down!*
Otherwise, the A051 ECU, engine control unit may be damaged.

B Faults

1 Faults on the Common Rail diesel engine (without fault code) 57

1 Faults on the Common Rail diesel engine (without fault code)

Faults	Cause	Note
The engine does not start or starts poorly	**Incorrect ignition key** The tractor has an immobiliser. When using an unauthorised ignition key, the A051 ECU, engine control unit releases no starting quantity and the engine can not start	Chapter 9000 Reg. E – B083 immobiliser control unit
	R002 heater flange defective (coolant water temperature below 5°C)	Chapter 9000 Reg. E – R002 heater flange
	Fuel filter clogged, fuel low pressure below approx. 5 bar , (B087 fuel low pressure sensor)	Chapter 2060 Reg. A – Fuel system, Chapter 9000 Reg. E – B087 fuel low pressure sensor
	Fuel pump (gear driven) defective	Chapter 2060 Reg. A – Fuel system,
	air in the fuel system	Chapter 2060 Reg. A – Fuel system,
	Y095/Y096/Y097/Y098/Y100/Y101 injector defective	Chapter 9000 Reg. E – Y095/Y096/Y097/Y098/Y100/Y101 injector
	Y091 dispensing unit defective Y091 dispensing unit de-energised = fully open Y091 dispensing unit fully energised = closed	Chapter 9000 Reg. E - Y091 dispensing unit
	High pressure pumps are worn	Chapter 2060 Reg. A – Fuel system,
	G001 battery defective or not charged	Chapter 9000 Reg. E – G001 battery
	Cable connections to the M001 starter oxidised or loose	Chapter 9000 Reg. E – M001 starter
	A051 ECU, engine control unit defective	Chapter 9000 Reg. E – A051 ECU, engine control unit
	Incorrect valve play	Chapter 2010 Reg. F – Adjusting the valve
	PR - LS pump does not swivel back to zero delivery Check the load sensing pressure and LS pump	Chapter 9600 Reg. A – Pressure regulation PR (axial piston pump) Chapter 9600 Reg. F – Hydraulic test report (fax template)
	Incorrect fuel	See the fuels and lubricants list
	Incorrect engine oil	
The engine starts, but runs irregularly or switches off **The engine has low power**	**Fuel filter clogged,** fuel low pressure below approx. 5 bar , (B087 fuel low pressure sensor)	Chapter 2060 Reg. A – Fuel system,
	Engine brake closed	Chapter 9000 Reg. E – A051 ECU, EDC engine control unit Chapter 9000 Reg. E – S047 engine brake switch Chapter 9000 Reg. E – Y006 engine brake solenoid valve Chapter 8800 Reg. C – Compressed air system wiring diagram "4-circle"
	Intercooler dirty	Chapter 2190 Reg. A – Air inlet and exhaust gas routing
	Turbocharger worn	Chapter 2190 Reg. A – Air inlet and exhaust gas routing
	B092 boost pressure/charge air temperature sensor defective	Chapter 9000 Reg. E – B092 boost pressure/charge air temperature sensor
	Incorrect valve play	Chapter 2010 Reg. F – Adjusting the valve

Faults	Cause	Note
	air in the fuel system	Chapter 2060 Reg. A – Fuel system,
	Engine air bleed clogged (overpressure in the crankcase)	Chapter 2210 Reg. A – Crankcase air bleed
	Fuel pump (gear driven) worn	Chapter 2060 Reg. A – Fuel system,
	Y095/Y096/Y097/Y098/Y100/Y101 injector defective	Chapter 9000 Reg. E – Y095/Y096/Y097/Y098/Y100/Y101 injector
	Y091 dispensing unit defective Y091 dispensing unit de-energised = fully open Y091 dispensing unit fully energised = closed	Chapter 9000 Reg. E - Y091 dispensing unit
	B086 rail pressure sensor (high pressure) defective	Chapter 9000 Reg. E – B087 rail pressure sensor (high pressure)
	High pressure pumps are worn	Chapter 2060 Reg. A – Fuel system,
	A051 ECU, engine control unit defective	Chapter 9000 Reg. E – A051 ECU, engine control unit
	Piston rings/cylinder liner worn (check compression pressure)	See the Deutz TCD 2013 engine workshop manual
Engine overheating	**Engine oil level** too low	See the operating manual
	Engine oil level too high	See the operating manual
	Water cooler contaminated	Chapter 2000 Reg. A – Coolant circuit
	Water cooler calcified	Chapter 2000 Reg. A – Coolant circuit
	Thermostat defective	Chapter 2000 Reg. A – Coolant circuit
	Engine oil cooler (heat exchanger) defective Cold engine = the engine oil warms the coolant At operating temperature = the coolant cools the engine oil	Chapter 2000 Reg. A – Coolant circuit
	Bleed lines in the coolant circuit clogged	Chapter 2000 Reg. A – Coolant circuit
	B077 electr. viscous fan defective Unplugging the X1532 separation point causes the viscous fan clutch to become fully engaged.	Chapter 9000 Reg. E – B077 electr. viscous fan (magnetic clutch speed sensor)
	B089 coolant temperature sensor defective	Chapter 9000 Reg. E – B089 coolant temperature sensor
	Y095/Y096/Y097/Y098/Y100/Y101 injector defective	Chapter 9000 Reg. E – Y095/Y096/Y097/Y098/Y100/Y101 injector
The engine does not run on all cylinders (1 cylinder on flywheel)	**Fuel filter clogged,** fuel low pressure below approx. 5 bar , (B087 fuel low pressure sensor)	Chapter 2060 Reg. A – Fuel system,
	air in the fuel system	Chapter 2060 Reg. A – Fuel system,
	Injection line leaking	Chapter 2060 Reg. A – Fuel system,
	High-pressure pump worn	Chapter 2060 Reg. A – Fuel system,
	Y095/Y096/Y097/Y098/Y100/Y101 injector defective	Chapter 9000 Reg. E – Y095/Y096/Y097/Y098/Y100/Y101 injector
	Incorrect valve play	Chapter 2010 Reg. F – Adjusting the valve
	Piston rings/cylinder liner worn (check compression pressure)	See the Deutz TCD 2013 engine workshop manual

Faults	Cause	Note
Engine has no or too low oil pressure (warning message on A007 instrument panel)	**Wrong engine oil**	See the fuels and lubricants list
	Engine oil level too low	See the operating manual
	Engine incline too large	See the operating manual
	Engine oil pressure DBV has opened	See chapter 2312 Reg. A – Engine lubrication diagram See chapter 9000 Reg. E – B090 engine oil pressure sensor
	Lubrication pump worn	See chapter 2312 Reg. A – Engine lubrication diagram See chapter 9000 Reg. E – B090 engine oil pressure sensor
	B090 engine oil pressure sensor defective	See chapter 9000 Reg. E – B090 engine oil pressure sensor
Oil consumption of the engine is too high	**Wrong engine oil**	See the fuels and lubricants list
	Engine oil level too high	See the operating manual
	Engine incline too large	See the operating manual
	Piston rings/cylinder liner worn (check compression pressure)	See the Deutz TCD 2013 engine workshop manual
Engine emits blue smoke (burning of engine oil)	**Engine oil level too high**	See the operating manual
	Engine incline too large	See the operating manual
	Engine operating temperature too low	Chapter 2000 Reg. A – Coolant circuit Chapter 9000 Reg. E – B077 electr. viscous fan (magnetic clutch speed sensor)
	Piston rings/cylinder liner worn (check compression pressure)	See the Deutz TCD 2013 engine workshop manual
	Engine air bleed clogged (overpressure in the crankcase)	Chapter 2210 Reg. A – Crankcase air bleed
Engine emits white smoke (burning of water)	**R002 heater flange** defective (coolant water temperature below 5°C)	Chapter 9000 Reg. E – R002 heater flange
	Water in fuel (water sedimentor) (monitored by the B091 water in fuel sensor)	Chapter 9000 Reg. E – B091 water in fuel sensor
	Incorrect fuel	See the fuels and lubricants list
	Incorrect valve play	Chapter 2010 Reg. F – Adjusting the valve
	Y095/Y096/Y097/Y098/Y100/Y101 injector defective	Chapter 9000 Reg. E – Y095/Y096/Y097/Y098/Y100/Y101 injector

Faults	Cause	Note
Engine emits black smoke (burning of diesel)	**Air filter clogged**	See the operating manual
	Y095/Y096/Y097/Y098/Y100/Y101 injector defective	Chapter 9000 Reg. E – Y095/Y096/Y097/Y098/Y100/Y101 injector
	Incorrect fuel	See the fuels and lubricants list

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2010

Engine/cylinder head

2010 Engine/cylinder head

G Repair. 5

G Repair

1 Adjusting valves (Deutz engine) 7

1 Adjusting valves (Deutz engine)

Tractor series (selection)	Engine series	Valve clearance (with a cold engine, temperature below 80 °C)		Locknut tightening torque	Adjustment tool
		Inlet valve	Exhaust valve		
Tractors with Deutz engine ("Common Rail" high-pressure accumulator) Note: 1. Cylinder on flywheel					
FENDT 900 Vario COM3	TCD 2013 L6 V4	75°	105°	20 Nm	X899.980.236.030

X899.980.236.030 adjustment tool

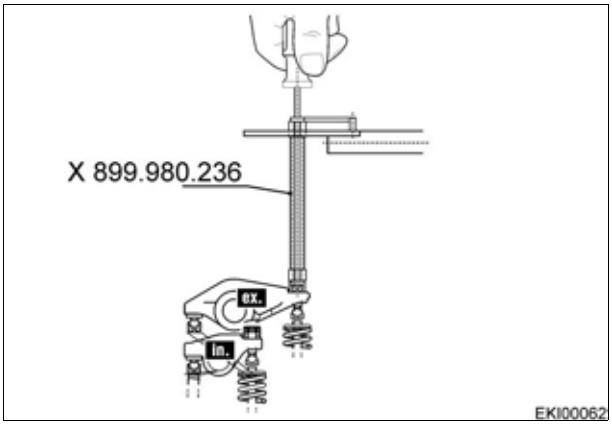

Fig. 1. I002479

Cylinder numbering (Deutz engine)

The cylinders are counted starting from the flywheel.

The rotational direction of the engine is to the left, when looking at the flywheel (counterclockwise).

Firing sequence, 6-cylinder engine = 1 - 5 - 3 - 6 - 2 - 4

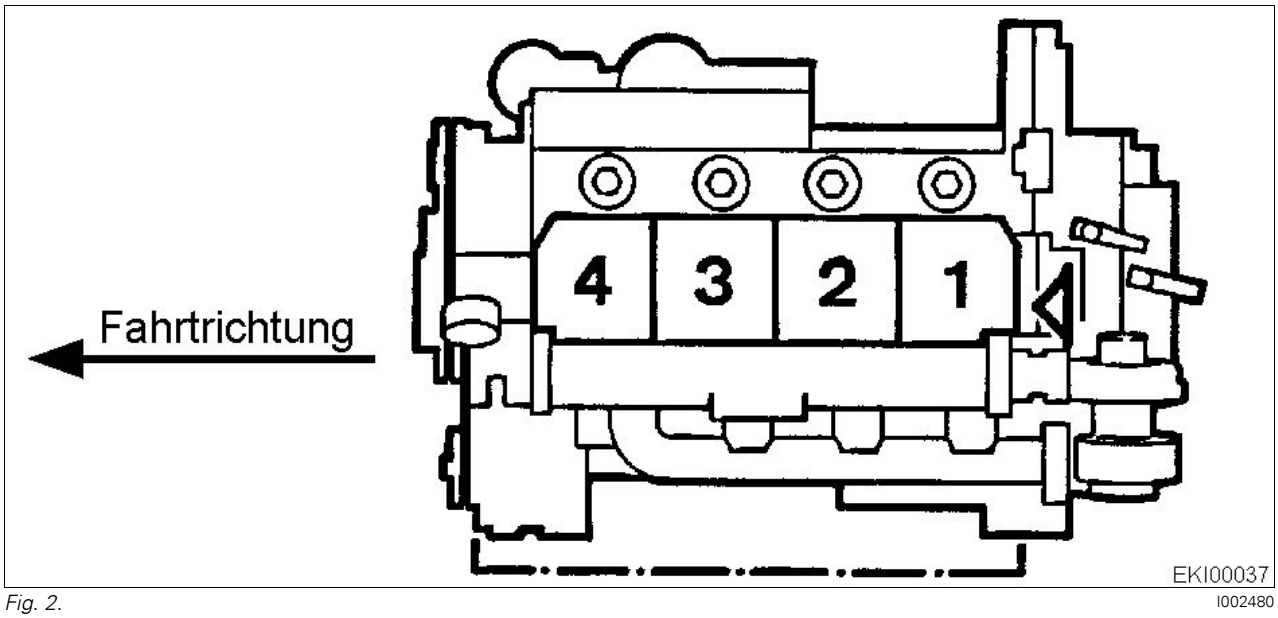

Fig. 2. I002480

Adjusting valve clearance (FENDT 900 Vario COM3 / Deutz TCD 2013)

See engine sign plate for engine type.

NOTE: *See also:*
- Technical datasheets
- Maintenance schedule

Fig. 3. I002481

Remove fixing bolts from K063 heater flange relay
Put K063 heater flange relay to one side

Fig. 4. I002484

Remove the engine ventilation

Fig. 5. I002482

Remove the valve cover

Fig. 6. I002483

EX = exhaust valve
IN = inlet valve

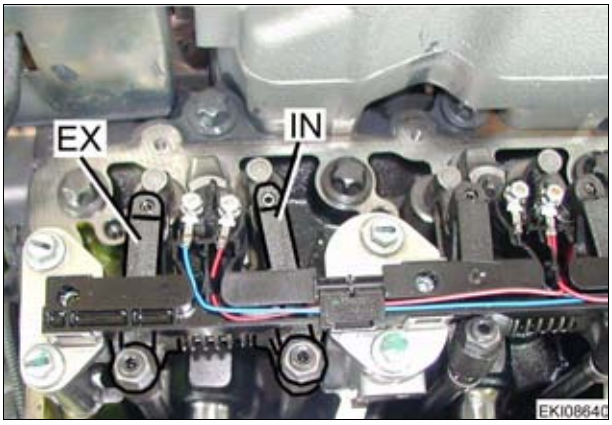

Fig. 7. I002485

1 = rocker arm
2 = valve spring
3 = push rod
4 = adjustment screw with locknut

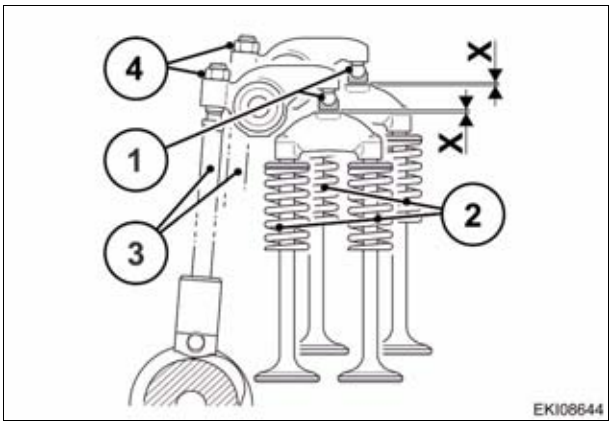

Fig. 8. I002489

Rotate the engine on the G002 or G004 alternator

NOTE: *The engine can only be turned against its rotational direction*

Adjust valves according to valve adjustment diagram (see below)

Fig. 9. I002486

Valve adjustment diagram, engine rotating backwards Note: Rotate the engine backwards on the G002/G004 alternator against its rotational direction						
Crossover Inlet valve closes Exhaust valve opens	**6**	**3**	**5**	**1**	**4**	**2**
Adjust	**1**	**4**	**2**	**6**	**3**	**5**

Position **X899.980.236.030** adjustment tool
Loosen locknut
Screw in the adjustment screw until the rocker arm lies directly on the valve with no clearance
Set the indicator to 0
Turn back the adjustment screw until the required clearance is achieved.

Inlet valve (IN) = in. (75°)
Exhaust valve (EX) = ex. (105°)

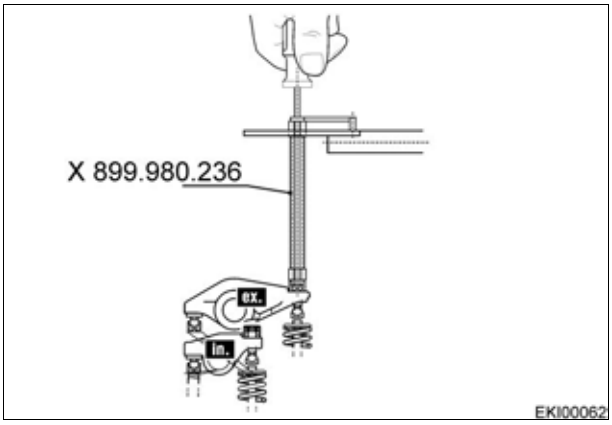

Fig. 10. I002496

Hold the adjustment screw in place with the screwdriver.
Lock the adjustment screw using the internal serration spanner
Locknut tightening torque = 20 Nm

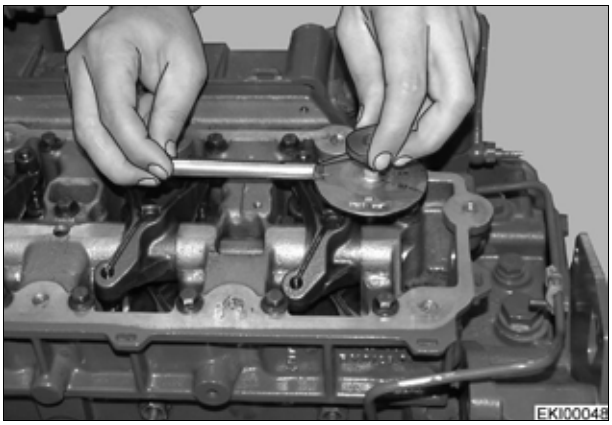

Fig. 11. I002499

Clean sealing surfaces and seals of valve cover
Tighten valve cover uniformly
Tightening torque = 8,5 Nm

NOTE: *Ensure the seals are in the correct position. Seals can be used more than once if they are not damaged.*

Fig. 12. I002483

Refit engine ventilation
Tightening torque = 20 Nm

Fig. 13. I002482

Refit the K063 heater flange relay

Fig. 14. I002484

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2050

Engine/cooling

2050 Engine/cooling

A General. 5

G Repair. 17

A General

1 Coolant circuit: Deutz TCD 2013 7
2 B077 electrical viscous fan 13

1 Coolant circuit: Deutz TCD 2013

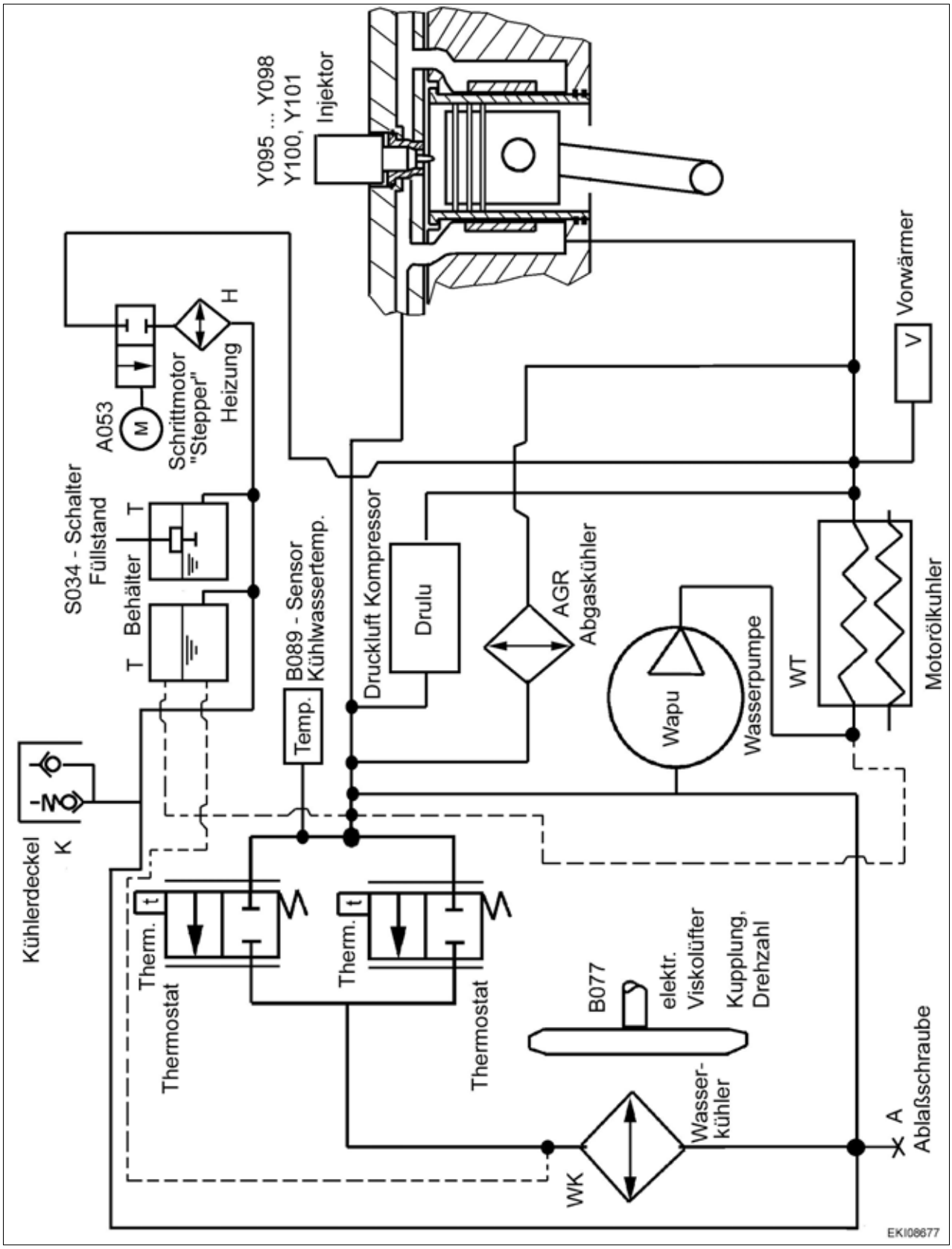


Fig. 1. I002720

Item	Designation	Item	Designation
Wapu	Water pump	B089	Water temperature sensor **Note:** See also: Chapter 9000 Reg. E - Measuring and testing the B089 water temperature sensor
WT	Engine oil cooler (heat exchanger)	K	Cooler cover: **Important: Do not open the cooler cover unless the engine is cold!**
V	Coolant pre-heater (optional)	T	Expansion tank **Coolant fill capacity: Approx. 30 l** **Proportion of cooling system protective agent min./max.: 35/45 Vol%**
Y095...Y098 Y100, Y101	Water-cooled injector (injector valve)	S034	Fill level sensor **Note:** See also: Chapter 9000 Reg. E - Measuring and testing S034 coolant level switch
Therm.	Thermostat **Start of opening: 87°C** **Perm. constant temperature: 110°C**	A053	Air conditioning unit (heater stepper motor, heat exchanger) **Note:** See also: Chapter 9000 Reg. E - A053 air conditioning unit (area: "Stepper" heater valve) Chapter 5500 Reg. G – Removing the air conditioning unit
WK	Water cooler (with water drain plug (A)	Drulu	Air compressor
B077	Electr. viscous fan **Engine speed/fan speed ratio: 1.2** **Slip at fully engaged viscous fan: Approx. 7%** **Max. viscous fan speed at rated speed: 2460 rpm** **Note:** See also: Chapter 9000 Reg. E – Measuring and testing B077 electr. viscous fan	AGR	Exhaust gas recirculation (exhaust gas cooler) Note: See also: Chapter 9000 Reg. E – Y094 exhaust gas recirculation actuator motor

Component position

Wapu = water pump

At the front of the engine

NOTE: *See also:*
Chapter 2000 Reg. A - Belt drive: Deutz TCD 2013

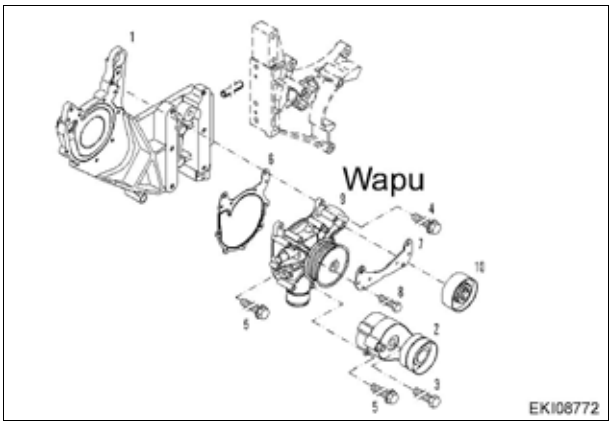


Fig. 2. I002721

WT = engine oil cooler (heat exchanger)

On right side of engine

Remove the filter mount

NOTE: *The heat from the engine oil is transferred to the coolant in the engine oil cooler.*
The engine oil is cooled to approx. 120...130°C.
When the engine is cold, the cold engine oil is heated by the warm coolant.

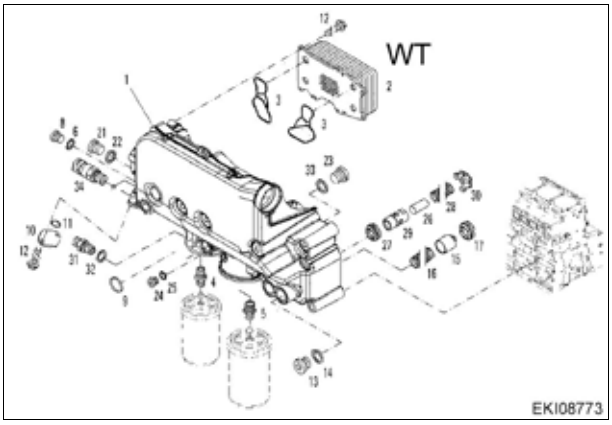


Fig. 3. I002722

V = pre-heater (coolant) (optional)

On right side of the engine, on the engine oil cooler

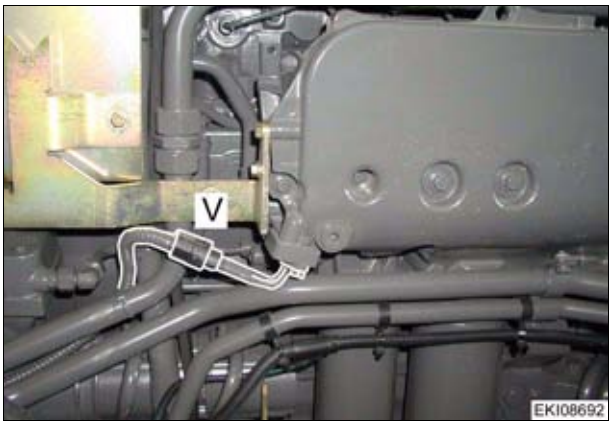


Fig. 4. I002727

Socket for the pre-heater (coolant)

At the left entrance step

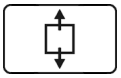
Fig. 5. I002728

Y - injector (injector valve)

The injectors are water-cooled
The bush is sealed off from the cylinder head by an O-ring.

Fig. 6. I002724

The bush is caulked (rolled) against the cylinder (combustion chamber) (arrow)



Remove the cylinder head

Fig. 7. I002729

The cylinder liner is sealed off from the crankcase by two O-rings

Fig. 8. I002730

Upper guidance and sealing of the cylinder liner with a conical guide

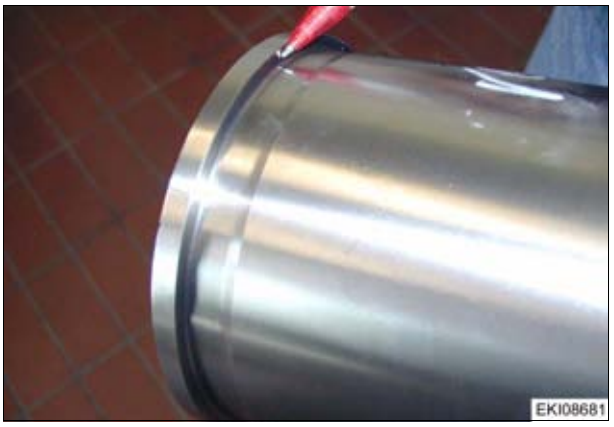


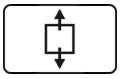
Fig. 9. I002732

Water ducts in the crankcase

Fig. 10. I002731

Therm. = thermostat

At the front of the engine



Remove the thermostat housing

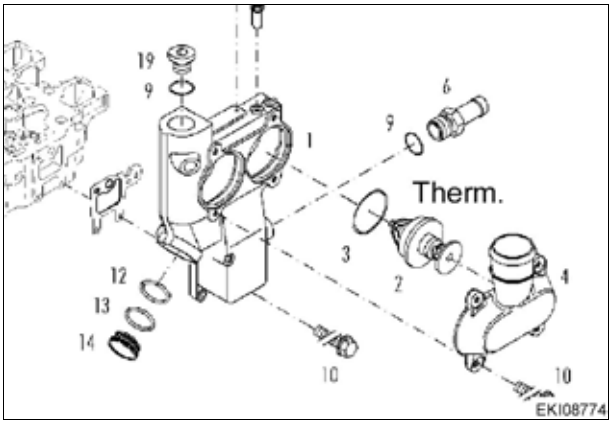


Fig. 11. I002723

Water cooler with drain plug

On left side of engine.

Fig. 12. I002726

B089 water temperature sensor

At front of the engine, on the thermostat housing

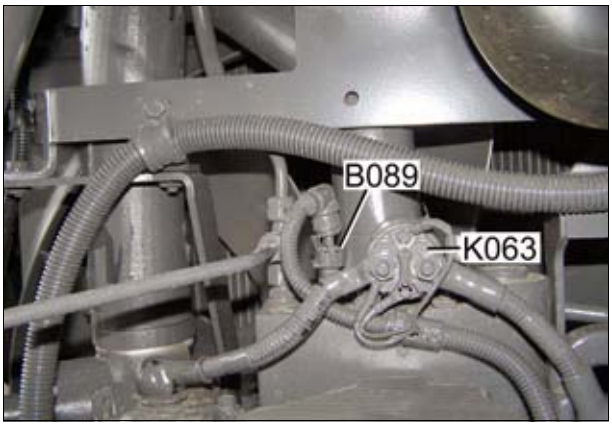


Fig. 13. I001088

Cooler cover (K)
Expansion tank (T)
S034 coolant level sensor

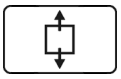
At top in engine compartment

WARNING: Do not open the cooler cover unless the engine is cold!

Fig. 14. I001131

A053 air conditioning unit (heater stepper motor and heat exchanger)

Installed under the cab



Open the service hatch in the cab floor

Fig. 15. I001501

Exhaust gas recirculation (AGR)
The recirculated gas is water-cooled

On left side of engine.

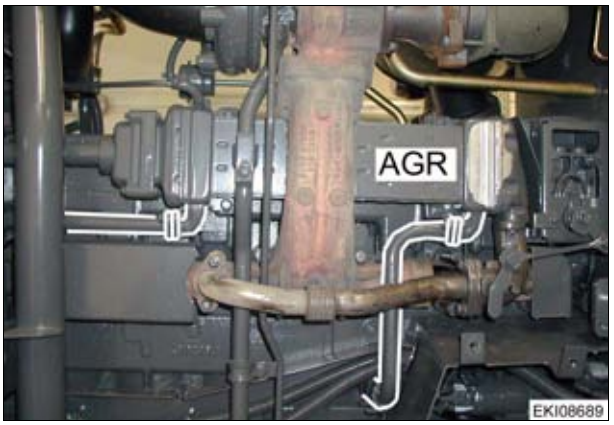


Fig. 16. I002725

2 B077 electrical viscous fan

Instead of a bi-metal viscous coupling, the FENDTD 900 COM III series has an electrical viscous fan installed.
The **B077** - Engine fan (speed sensor/magnetic clutch) is controlled via the **A051** - ECU, engine control unit (EDC 7). and should maintain the coolant temperature at approx. 95°C. The coolant temperature is the main controlled value.

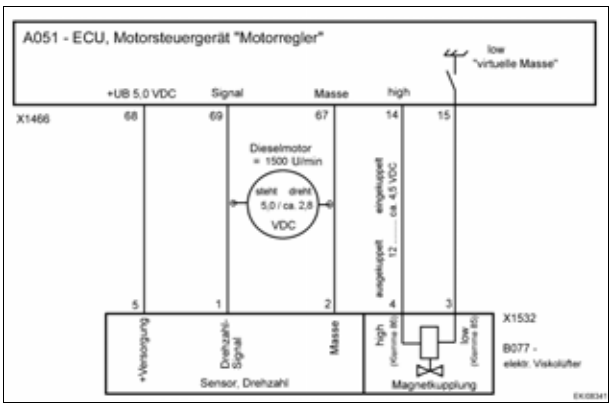


Fig. 17. I002035

The electrical viscous fan can also be controlled via the transmission oil temperature.
The **B009** - Discharge temperature sensor transmits the transmission oil temperature to the **A050** - ECU, basic control unit. The **A050** - ECU, basic control unit transmits the temperature via the G-bus to the **A051** - ECU, engine control unit (EDC 7). and can thus control the**B077** - Engine fan (speed sensor/magnetic clutch).
The electr. viscous fan can also be controlled via the hydraulic oil temperature.
The **B013** - Sensor, hydraulic oil temperature transmits the hydraulic oil temperature to the **A007** - Instrument panel. Transmission to the **A050** - ECU, basic control unit occurs via K-bus The **A050** - ECU, basic control unit transmits the temperature via the G-bus to the **A051** - ECU, engine control unit (EDC 7). and can thus control the **B077** - Engine fan (speed sensor/magnetic clutch).

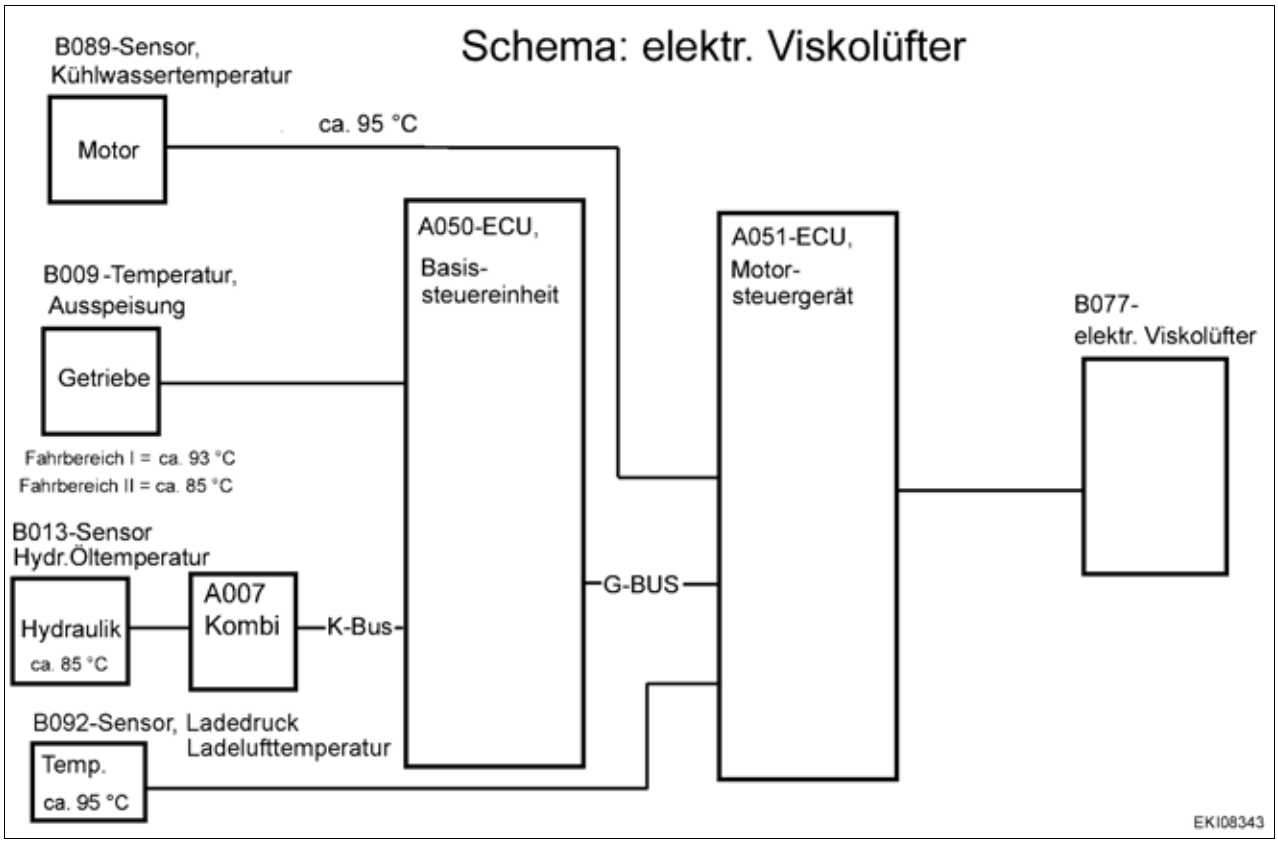


Fig. 18. I002034

Connecting the B077 electr. viscous fan

Unplugging the X1532 separation point causes the viscous fan clutch to become fully engaged.
The fan belt drive ratio is i = 1.2 to high speed.
The clutch is hydraulically calibrated so that a residual slip of about 5% remains even when the clutch is fully engaged.

Fig. 19. I002039

Unplug the X1532 separation point and test the speed of the viscous fan with a tachometer	
Engine speed (rpm)	**Fan speed (rpm)**
1500 rpm	Approx. 1710 rpm
1700 rpm	Approx. 1938 rpm
1900 rpm	Approx. 2166 rpm
2100 rpm	Approx. 2394 rpm
2300 rpm	Approx. 2622 rpm

Designation	Sensor	Condition for engagement	Note
Transmission	B009 discharge temperature sensor	**In travel range I (field): approx. 93 °C** (approx. 54 ohms) **In travel range II (road): approx. 85 °C** (approx. 70 ohms)	If the temperature limit is reached, the A051 ECU, engine control unit engages the B077 electr. viscous fan. The B077 electr. viscous fan is not controlled for the transmission oil temperature.
Working and steering hydraulics	B013 hydraulic oil temperature sensor	**approx. 85 °C** (approx. 240 ohms)	If the temperature limit is reached, the A051 ECU, engine control unit engages the B077 electr. viscous fan. The B077 electronic viscous fan is not controlled for the hydraulic oil temperature.

Designation	Sensor	Condition for engagement	Note
Diesel engine	B089 coolant temperature sensor	**approx. 95 °C** (approx. 200 ohms)	If the temperature limit is reached, the A051 ECU, engine control unit engages the B077 electr. viscous fan. The coolant temperature is limited to approx. 95°C by means of the B077 electr. viscous fan
	B092 boost pressure/charge air temperature sensor	**approx. 95 °C** (approx. 210 ohms)	If the temperature limit is reached, the A051 ECU, engine control unit engages the B077 electr. viscous fan. The B077 electr. viscous fan is not controlled for the charge air temperature

NOTE: *see §73*

G Repair

1 Removing radiators individually 19
2 Fitting radiators individually 25
3 Removing the cooler assembly 31
4 Fitting cooler assembly 36

1 Removing radiators individually

NOTE: *This section explains how to remove all radiators. It may not be necessary to carry out all the steps, depending on which radiator is causing the problem.*

Drain the coolant.

NOTE: *Only if the water cooler is being removed!*

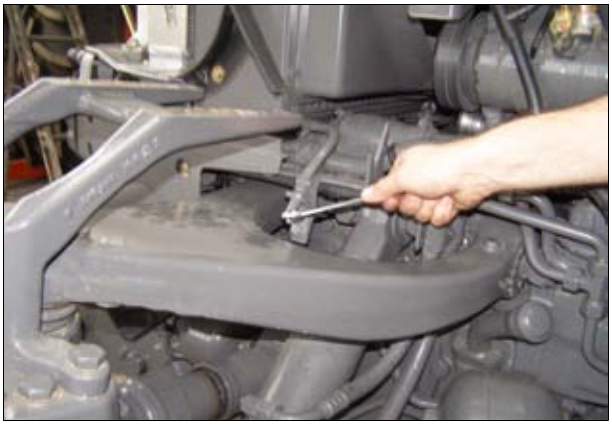


Fig. 1. I001470

Loosen plugs (arrows) on the left side and drain the oil

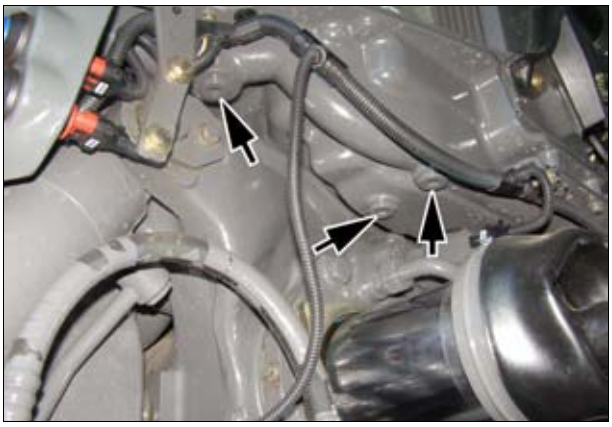


Fig. 2. I003256

Loosen plugs (arrows) on the right side and drain the oil

Fig. 3. I003257

Remove the condenser bracket.

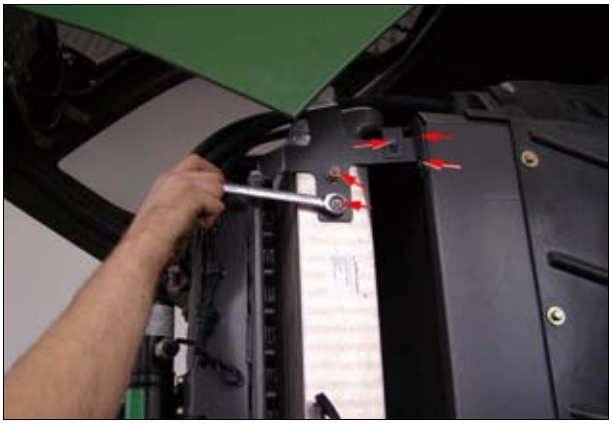


Fig. 4. I001418

Remove the protective cover from the radiator.

Fig. 5. I001419

Remove clamps and retaining brackets from the coolant hoses.

Fig. 6. I001420

Attach condenser to the engine

Fig. 7. I003298

Loosen clamp and pull out air hose

Fig. 8. I003266

Loosen clamp and pull out coolant hose

Fig. 9. I003267

Disconnect hydraulic line from the transmission oil cooler

Fig. 10. I003268

Loosen clamp and remove charge air hose

Fig. 11. I003211

Loosen clamp and remove coolant hose

Fig. 12. I003322

Remove screws on the hydraulic oil cooler

Fig. 13. I003212

Remove the hydraulic oil cooler

Fig. 14. I003213

Remove the water cooler bracket on the intercooler

Fig. 15. I003258

Remove the cover panel from the charge air transmission oil cooler

Fig. 16. I003259

Remove the retaining bolts on the charge air transmission oil cooler

Fig. 17. I003260

Remove the charge air transmission oil cooler

Fig. 18. I003261

Remove the intake air duct

Fig. 19. I003217

Remove the ventilator cowl bolts and slide the cowl back

Fig. 20. I003219

Remove the bolts on the water cooler retaining bracket

Fig. 21. I003323

Remove the retaining bolts on the water cooler

Fig. 22. I003262

Remove the water cooler

Fig. 23. I003263

2 Fitting radiators individually

Use a small amount of grease to seat the O-rings

Fig. 24. I003320

Fit the water cooler

Fig. 25. I003263

Fit the water cooler retaining bolts and bearing

Fig. 26. I003262

Slide the ventilator cowl forwards and fit the cowl bolts

Fig. 27. I003219

Fit the water cooler on the retaining bracket

Fig. 28. I003323

Fit the intake air duct

Fig. 29. I003217

Fit the charge air transmission oil cooler

NOTE: *Take care not to damage the O-rings!*

Fig. 30. I003261

Fit the retaining bolts on the charge air transmission oil cooler

Fig. 31. I003260

Fit the cover panel bolts on the charge air transmission oil cooler

Fig. 32. I003259

Fit the water cooler bracket on the intercooler

Fig. 33. I003258

Fit the hydraulic oil cooler

NOTE: *Take care not to damage the O-rings!*

Fig. 34. I003213

Fit the bolts on the hydraulic oil cooler

Fig. 35. I003212

Fit the charge air hose and tighten the clamp

Fig. 36. I003211

Fit the coolant hose and tighten the clamp

Fig. 37. I003322

Fit the hydraulic line on the transmission oil cooler

Fig. 38. I003268

Fit the coolant hose and tighten the clamp

Fig. 39. I003267

Fit the air hose and tighten the clamp

Fig. 40. I003266

Place condenser in position and fit the bracket

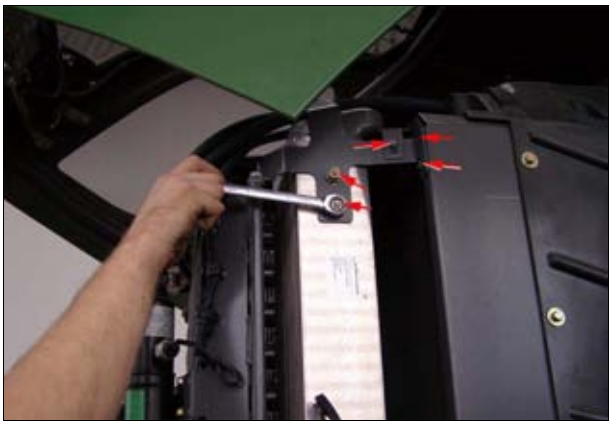


Fig. 41. I001418

Fit the protective cover on the radiator.

Fig. 42. I001419

Fit clamps and retaining brackets on the coolant hoses.

Fig. 43. I001420

Fit all screw plugs that were removed on the left and right sides

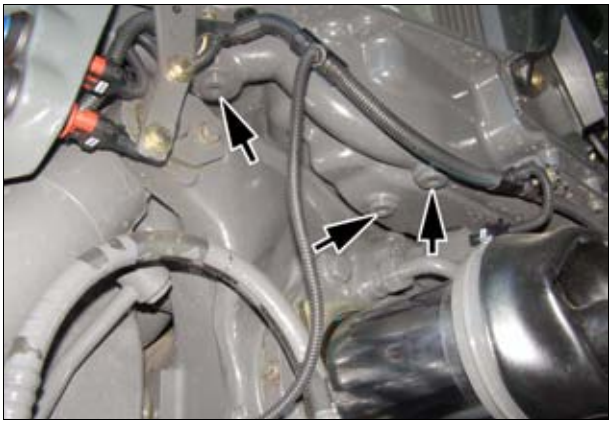


Fig. 44. I003256

Fit screw plug and fill with coolant

Fig. 45. I001470

3 Removing the cooler assembly

Drain the coolant.

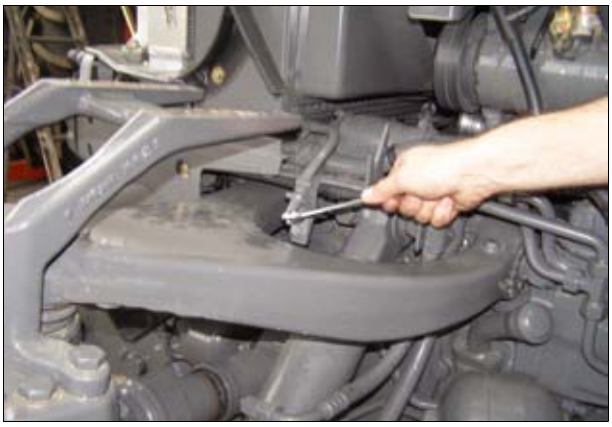


Fig. 46. I001470

Loosen plugs (arrows) on the left side and drain the oil

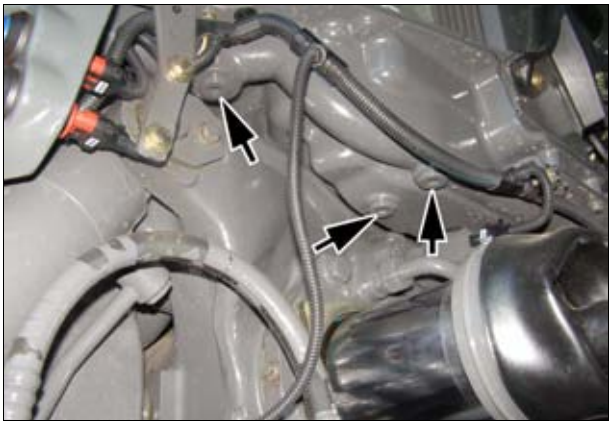


Fig. 47. I003256

Loosen plugs (arrows) on the right side and drain the oil

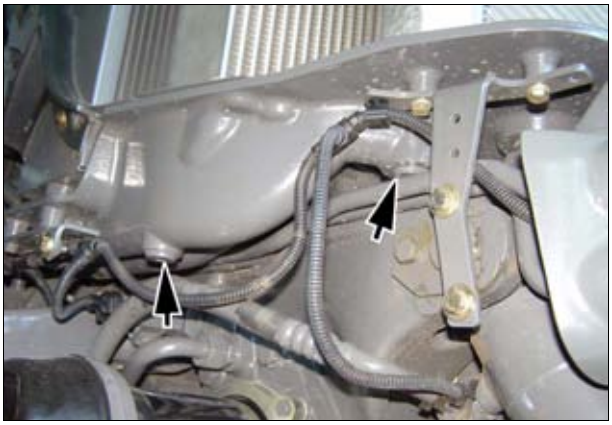


Fig. 48. I003257

Remove the condenser bracket.

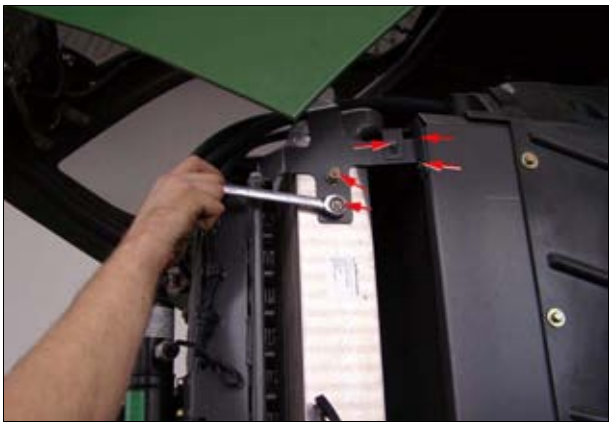


Fig. 49. I001418

Remove the protective cover from the radiator.

Fig. 50. I001419

Remove clamps and retaining brackets from the coolant hoses.

Fig. 51. I001420

Attach condenser to the engine

Fig. 52. I003298

Loosen clamp and pull out air hose

Fig. 53. I003266

Loosen clamp and pull out coolant hose

Fig. 54. I003267

Disconnect hydraulic line from the transmission oil cooler

Fig. 55. I003268

Disconnect both hydraulic lines from the cooler pan

Fig. 56. I003417

Loosen clamp and remove charge air hose

Fig. 57. I003211

Loosen clamp and remove coolant hose

Fig. 58. I003322

Disconnect the hydraulic line from the front return flow

Fig. 59. I003202

Loosen clamps and remove bottom charge air line

Fig. 60. I003209

Remove the intake air duct

Fig. 61. I003217

Remove the ventilator cowl bolts and slide the cowl back

Fig. 62. I003219

Remove the bolts on the water cooler retaining bracket

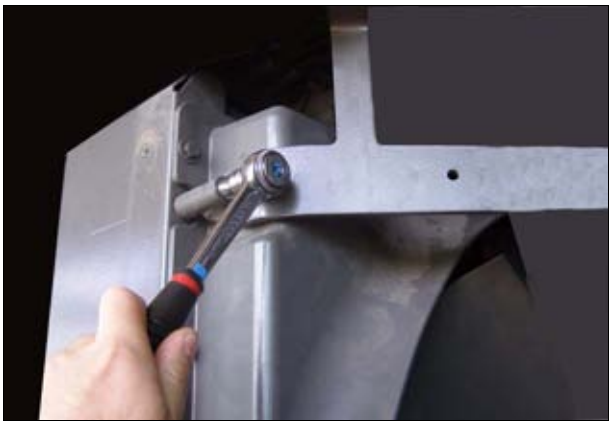


Fig. 63. I003323

Remove nuts and bearings from the pan

Fig. 64. I003220

Carefully lift and remove the cooler assembly

NOTE: *Ensure there is sufficient clearance between all components.*

DANGER: Do not walk or stand under suspended loads!

Fig. 65. I003418

4 Fitting cooler assembly

Carefully lift the cooler assembly and raise it into position

NOTE: *Ensure there is sufficient clearance between all components.*

DANGER: Do not walk or stand under suspended loads!

Fig. 66. I003418

Fit nuts and bearings on the cooler pan

Fig. 67. I003220

Slide the ventilator cowl forwards and fit the cowl bolts

Fig. 68. I003219

Fit the water cooler on the retaining bracket

Fig. 69. I003323

Fit the intake air duct

Fig. 70. I003217

Fit the charge air hose and tighten the clamp

Fig. 71. I003211

Fit the coolant hose and tighten the clamp

Fig. 72. I003322

Fit the hydraulic line on the front return flow

Fig. 73. I003202

Fit the hydraulic line on the transmission oil cooler

Fig. 74. I003268

Fit the coolant hose and tighten the clamp

Fig. 75. I003267

Fit the air hose and tighten the clamp

Fig. 76. I003266

Place condenser in position and fit the bracket

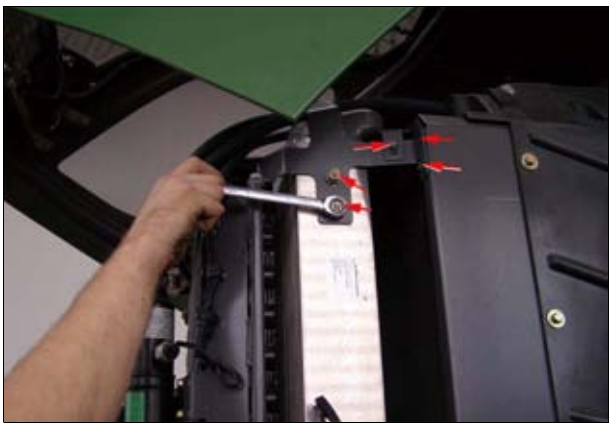


Fig. 77. I001418

Fit the protective cover on the radiator.

Fig. 78. I001419

Fit clamps and retaining brackets on the coolant hoses.

Fig. 79. I001420

Fit all screw plugs that were removed on the left and right sides

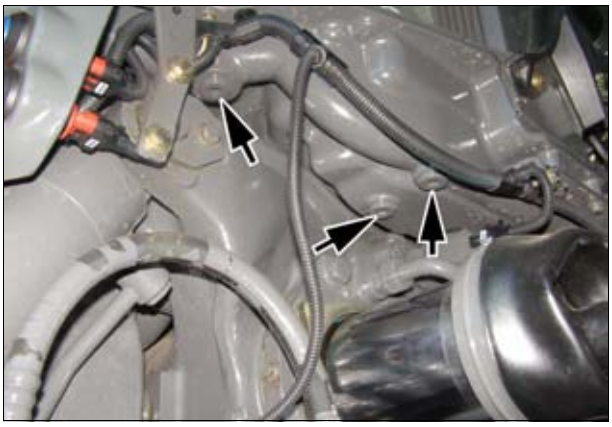


Fig. 80. I003256

Fit screw plug and fill with coolant

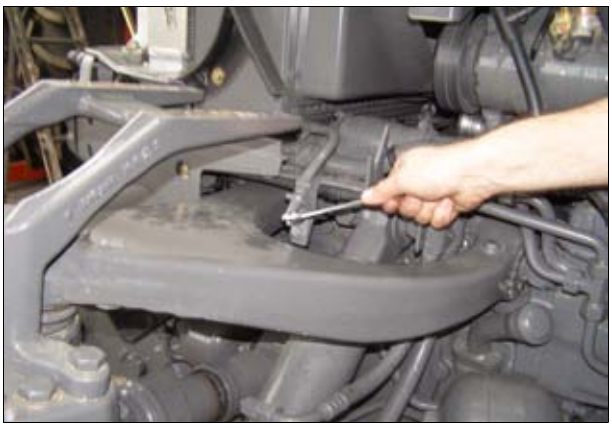


Fig. 81. I001470

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

2060

Engine/fuel system

2060 Engine/fuel system

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A General

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1 Fuel system

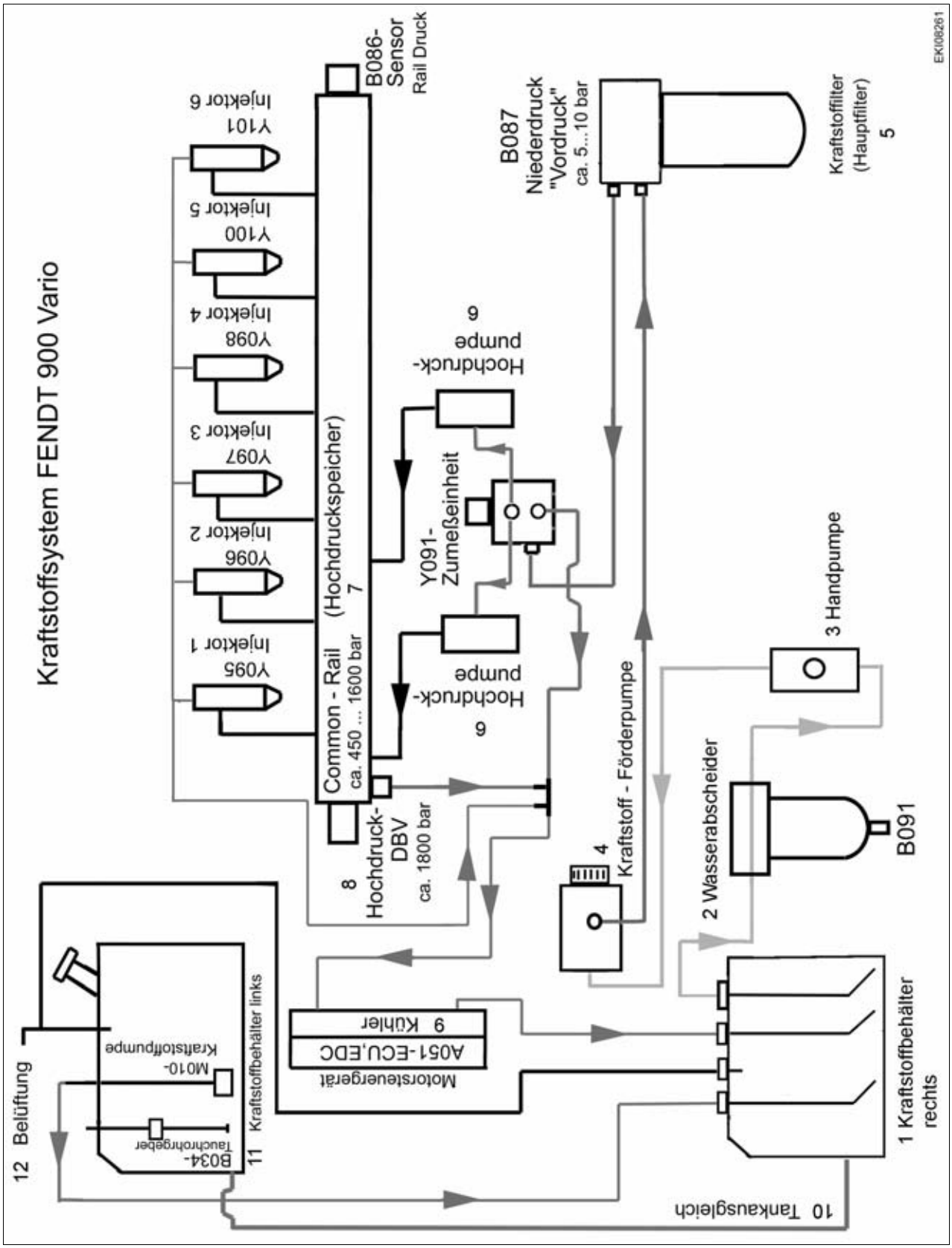

Fig. 1. I001554

Item	Designation	Item	Designation
1	Right fuel tank	B034	Immersed tube sensor
2	Water sedimentor	B086	Rail pressure sensor
3	Hand pump	B087	Low pressure "primary pressure" approx. 5 … 10 bar
4	Fuel delivery pump	B091	Water in fuel sensor
5	Fuel filter (main filter)	M010	Fuel pump
6	High-pressure pump	Y091	Dispensing unit
7	Common rail (high-pressure accumulator) approx. 450 to 1600 bar	Y095	Injector 1
8	High-pressure DBV approx. 1800 bar	Y096	Injector 2
9	Radiator	Y097	Injector 3
10	Tank compensator	Y098	Injector 4
11	Left fuel tank	Y100	Injector 5
12	Ventilation	Y101	Injector 6
A051	ECU, EDC engine control unit		

Fuel system		
Component	**Function**	**Reference**
A051 ECU, engine control unit (The engine control unit is cooled with fuel.)	Engine controller	Chapter 9000 Reg. E - A051 Measuring and testing
B034 immersed tube sensor (fuel)	Fuel display on A007 instrument panel	Chapter 9000 Reg. E - B034 Measuring and testing
B086 rail pressure sensor and high-pressure DBV	**B086 sensor** Detects actual pressure (approx. 400 to 1600 bar in the rail (high-pressure accumulator) **High-pressure DBV** Limits the max. pressure (approx. 1800 bar)	Chapter 9000 Reg. E - B086 Measuring and testing
B087 fuel low pressure sensor	Detects fuel low pressure "Fuel primary pressure" (approx. 6 bar)	Chapter 9000 Reg. E - B087 Measuring and testing
B091 water in fuel sensor	Detects the water level in the water sedimentor.	Chapter 9000 Reg. E - B091 Measuring and testing
M010 - Tank pump (circulation pump)	**Level indicator on the A007 instrument panel less than 4 bars. Diesel engine running** The fuel is pumped from the left fuel tank into the right fuel tank (in the direction of travel) (Advantage: higher fuel extraction volume)	Chapter 9000 Reg. E - M001 Measuring and testing
Y091 dispensing unit	Controls the fill quantity of the high-pressure pumps and thus also the pressure in the rail (high-pressure accumulator)	Chapter 9000 Reg. E - Y091 Measuring and testing
Y095 injector 1 (on the flywheel)	Injector valve	Chapter 9000 Reg. E – Y injector
Y096 injector 2		
Y097 injector 3		

Fuel system		
Component	**Function**	**Reference**
Y098 injector 4		
Y100 injector 5		
Y101 injector 6		

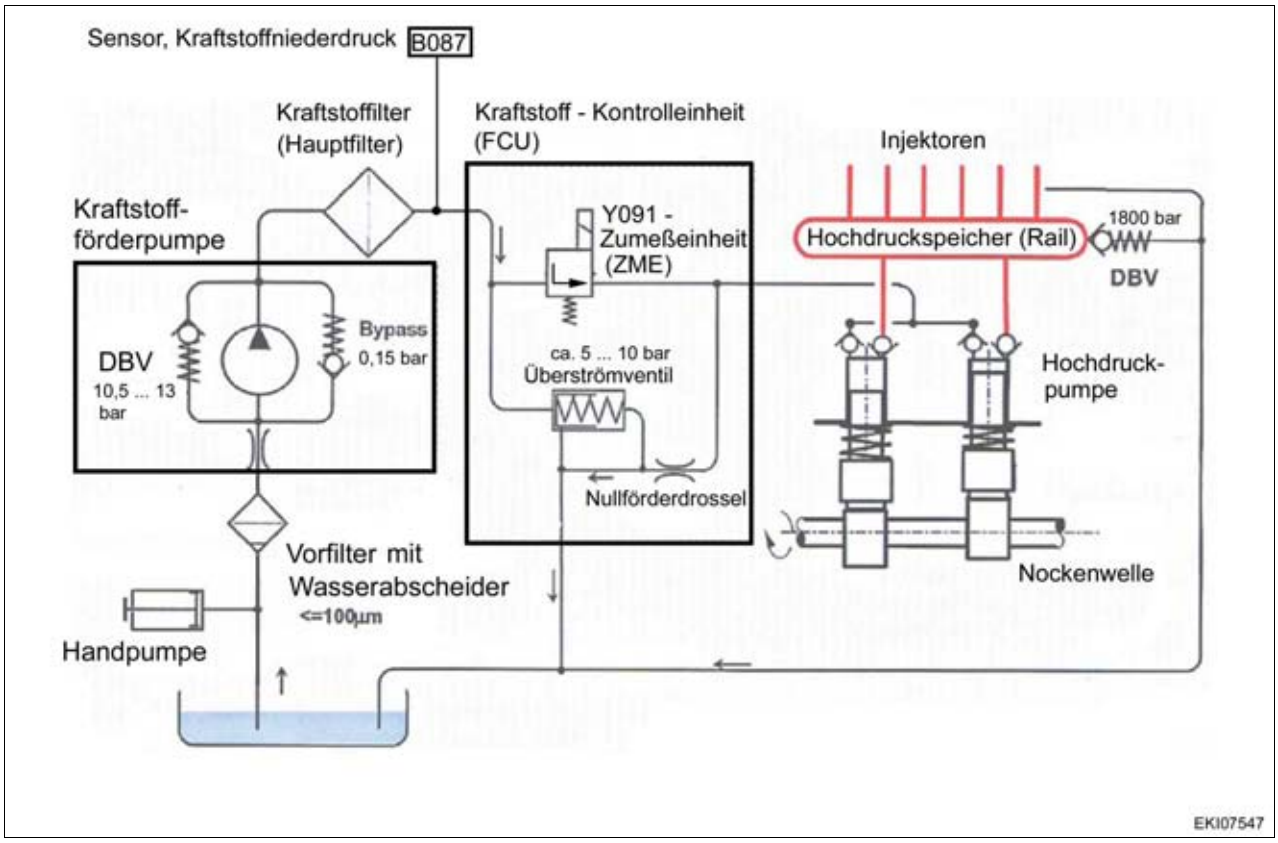

Fig. 2. I001583

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2 Water sedimentor (pre-filter)

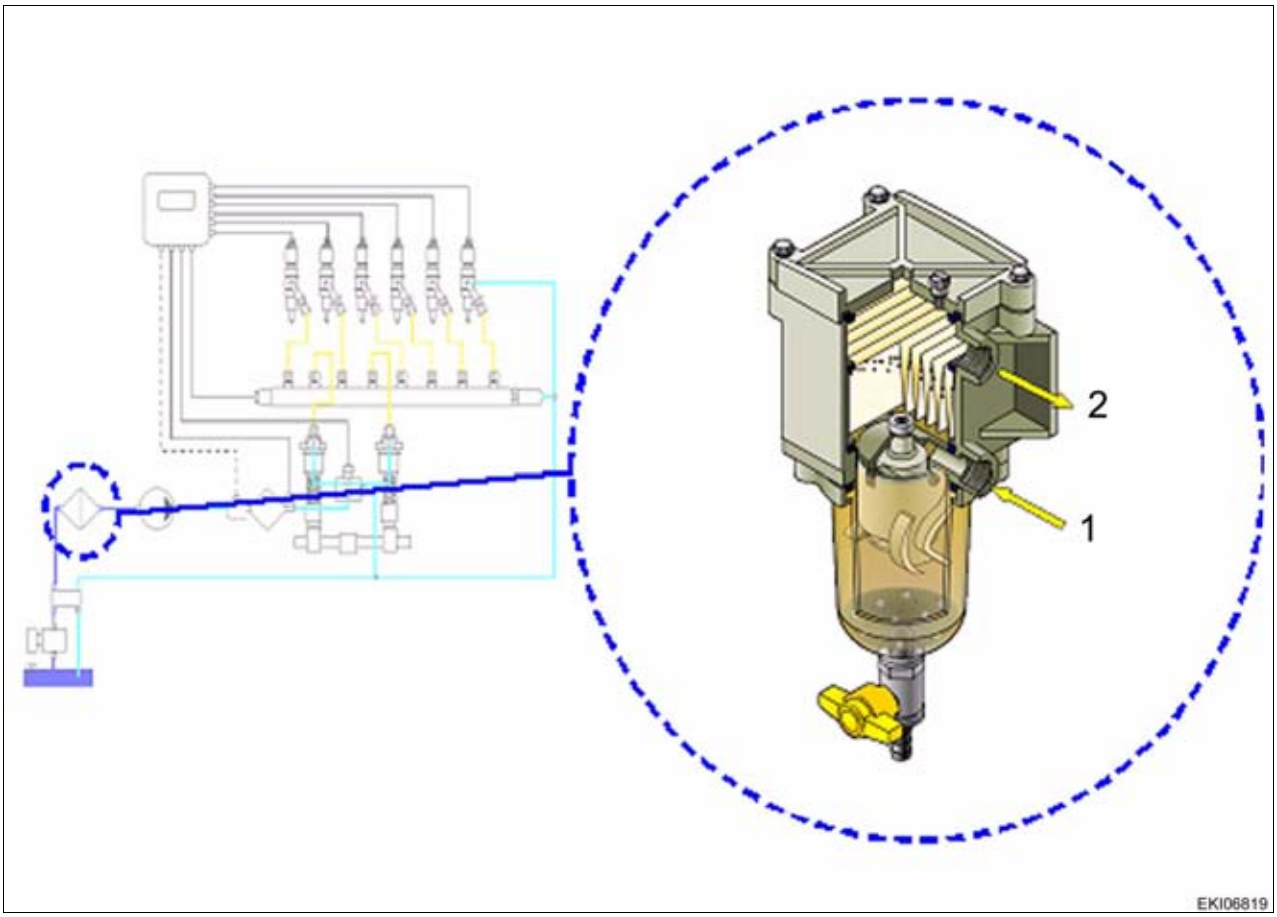


Fig. 3. I006254

Water sedimentor with pre-filter

1. Fuel inlet from the tank
2. Fuel outlet to the system

– Filter unit 30 µm
– Water sedimentation greater than 98%
– Sight glass with **B091** - Sensor, water in fuel
– Mechanical drain valve

Operating principle:
The common rail system is very sensitive to dirt and water. For this reason this filter is fitted to all common rail engines, and in addition the filter is fitted with a B091 sensor, which monitors water in the fuel.

Depending on the model of tractor and its chassis number, different models of filter are fitted; the diagram shows for all the models of tractor the first model in which the transition to a filter with an integral manual pump was made.

This pre-filter has the following function when contaminated fuel passes through it:

– The water that is found in the fuel is collected in the sight glass of the filter.
– The coarser dirt particles are filtered out by the filter (exchange element).

When the water in the filter reaches the maximum level, a sensor causes a warning message to be displayed on the instrument panel. The water must then be drained off without delay.

NOTE: *Refer to the care and maintenance chapter in the operator's manual.*

3 Fuel system: water sedimentor

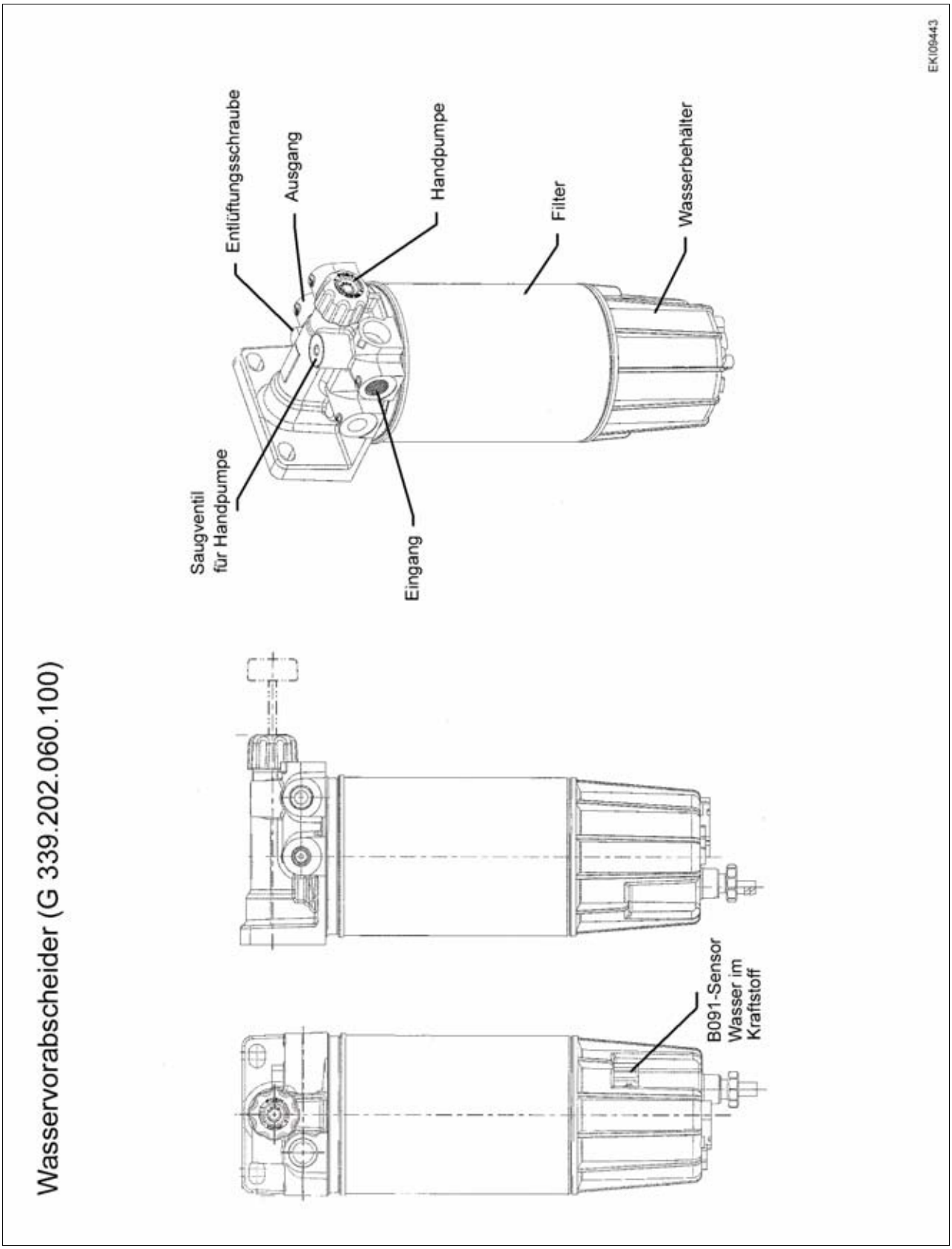


Fig. 4. I006584

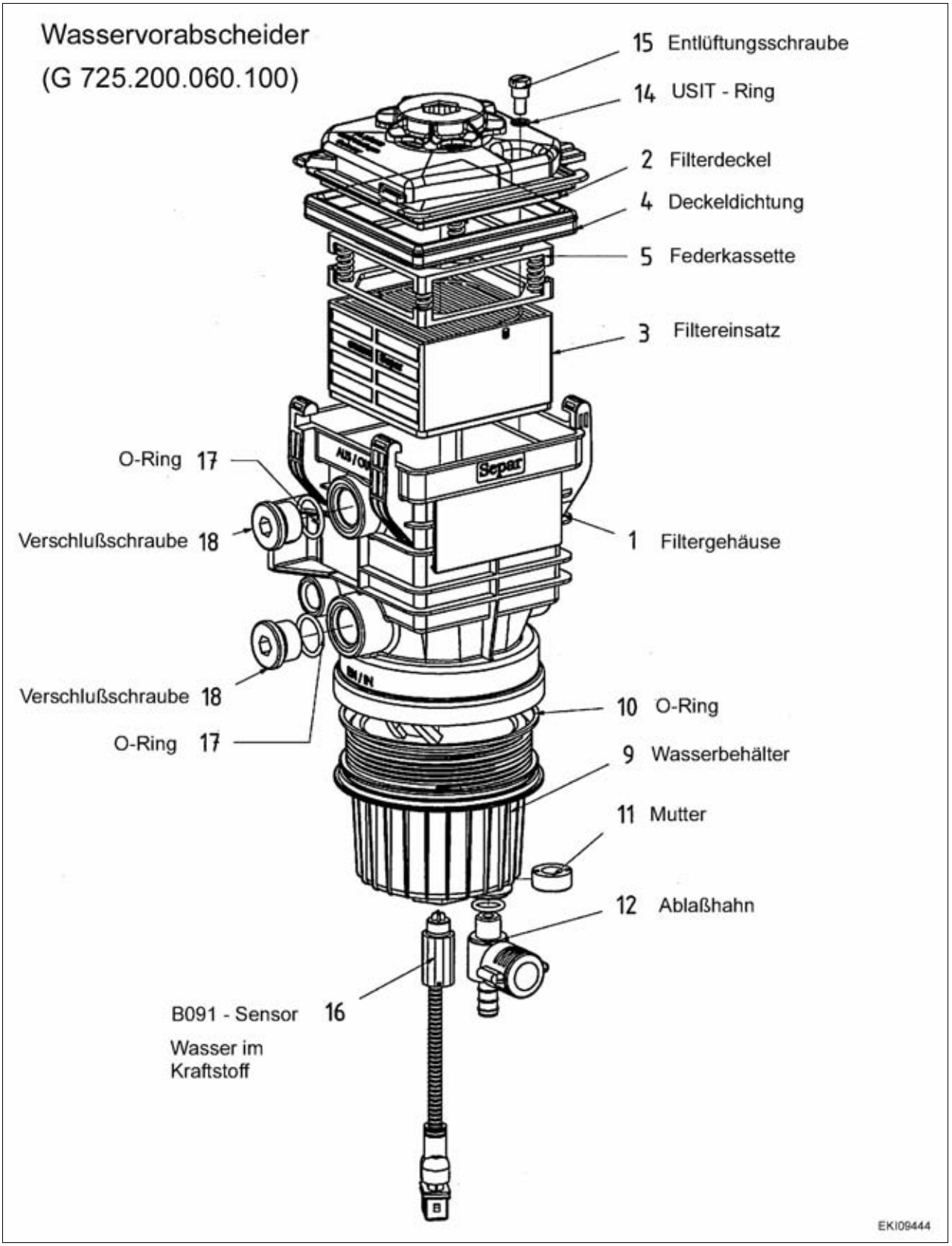


Fig. 5.

I006585

B091 water in fuel sensor

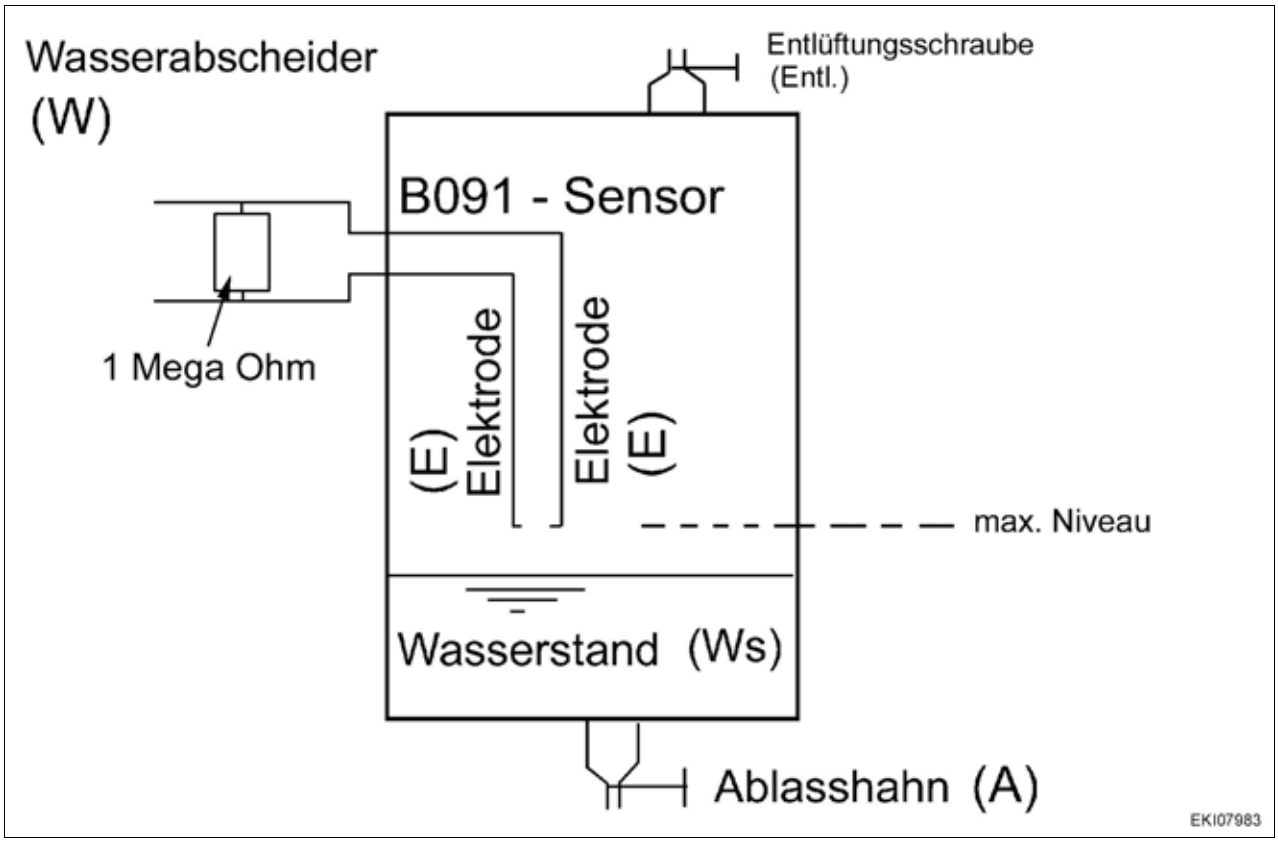


Fig. 6. I001617

The B091 sensor measures the water level in the water sedimentor.

Item	Designation	Item	Designation
A	Drain cock	Vent	Vent plug
B091	Water in fuel sensor	W	Water sedimentor
E	Electrode	WL	Water level

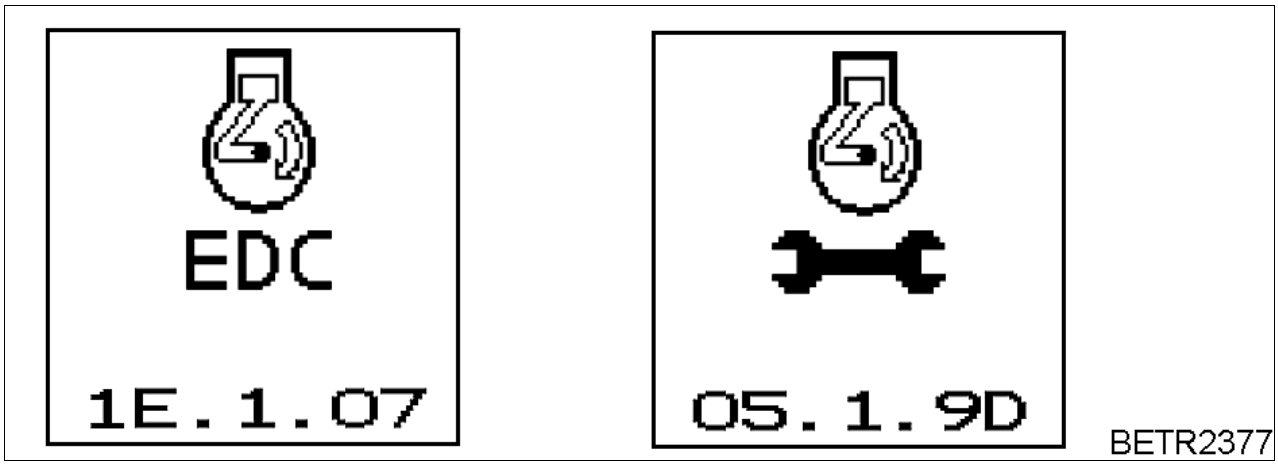


Fig. 7. I001618

If the water reaches the maximum permitted level:
An alert (A) appears in the multiple display,
Drain water and dirt

B091 water in fuel sensor	
	Resistance
Container filled with diesel	approx. 1 mega-ohm
Container filled with water (water level too high)	approx. 500 Kohms

NOTE: *For further tests, see chapter 9000 Reg. E – Measuring and testing*

4 Fuel pump

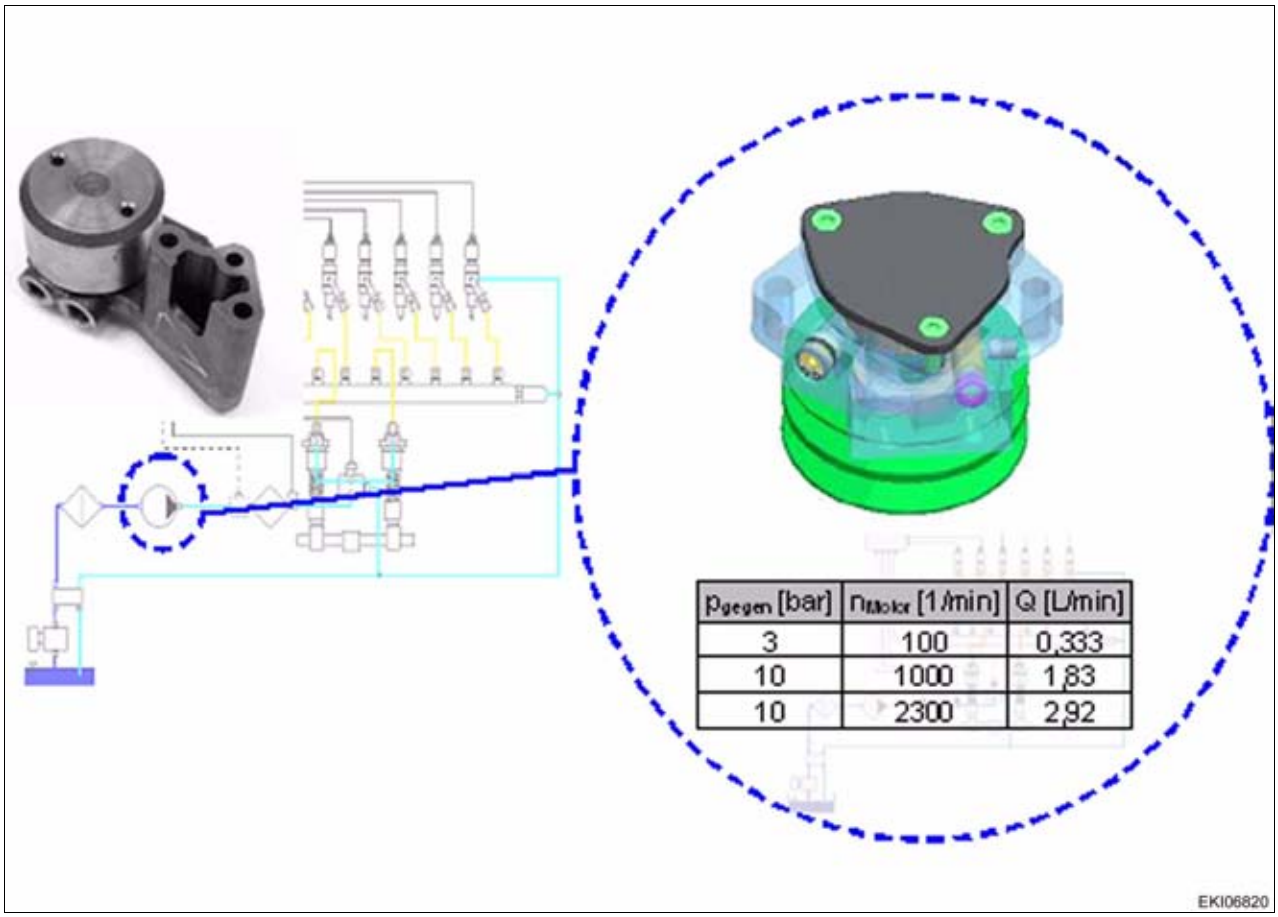


Fig. 8. I006256

Fuel pump

The fuel pump draws fuel from the fuel tank through the pre-filter and delivers it to the dispensing unit. The suction pressure is 0.5 to 0.8 bar and the delivery pressure is maintained at approx. 7 bar by means of the overflow valve.
The delivery quantity is very nearly proportional to the engine speed. At 2300 rpm it is approx. 175 l/h. The gear pump is maintenance-free and is lubricated and cooled by the fuel passing through it. The fuel pump is driven by the belt drive.

5 Y091 dispensing unit (fuel)

DANGER: After switching off the diesel engine, wait at least 30 seconds before starting any work on the fuel system!

CAUTION: Ensure the utmost cleanliness!
See Service Information 14/2007.

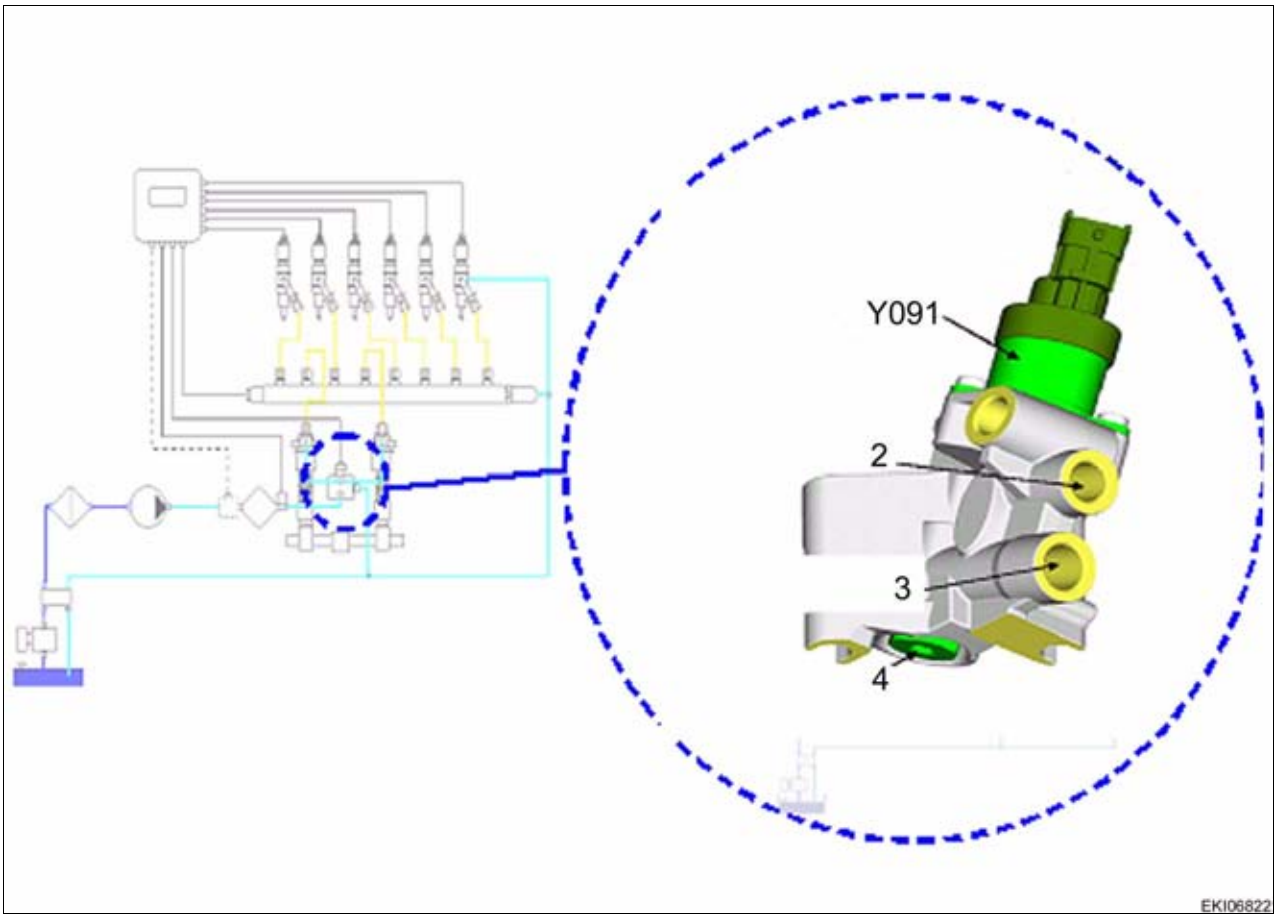


Fig. 9. I006257

Fuel flow: Dispensing unit

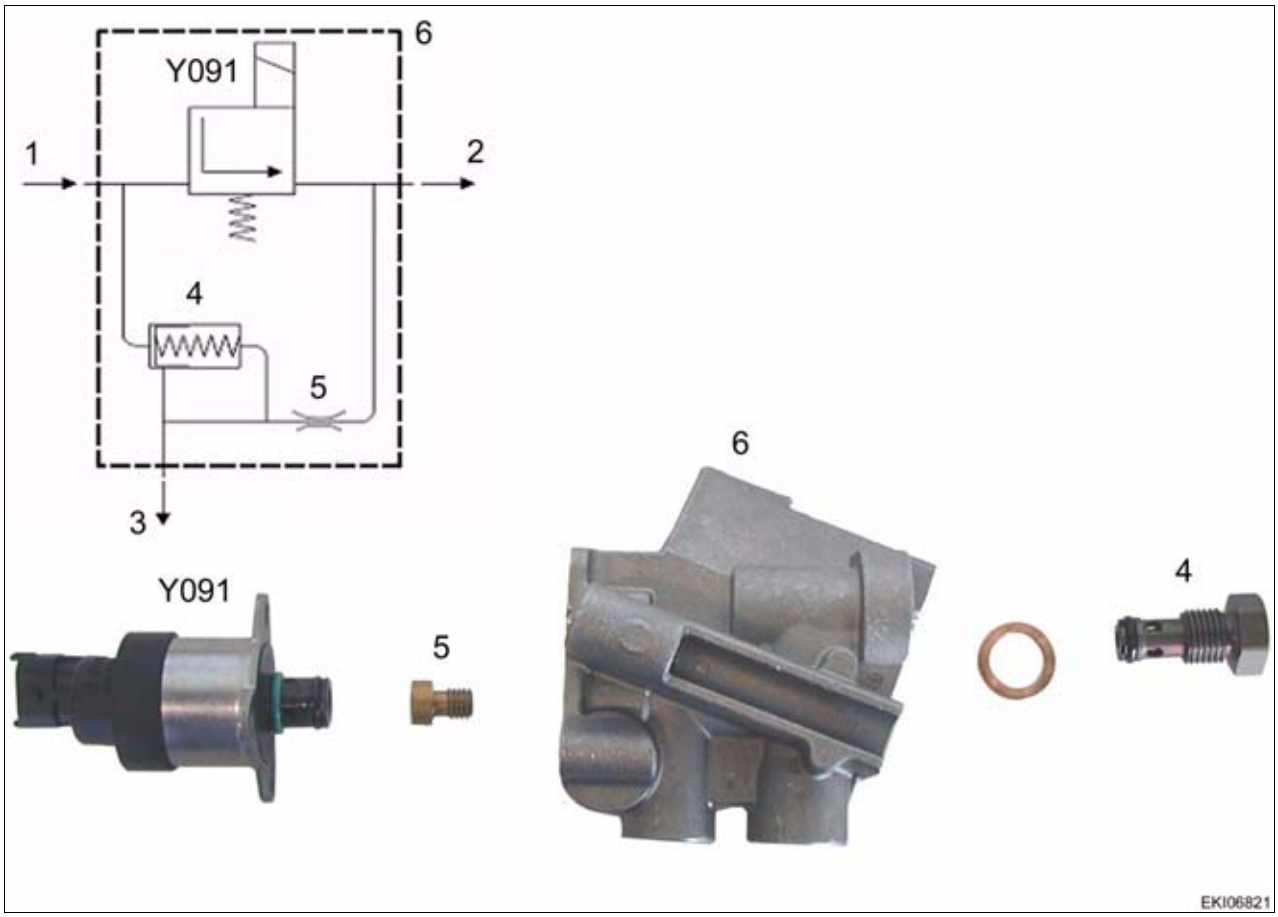


Fig. 10. I006258

Item	Designation	Item	Designation
Y091	Dispensing unit	3	Return flow
1	Feed	4	Overflow valve
2	To the high-pressure pumps	5	Zero-delivery choke

The **Y091** - Dispensing unit (fuel), which is governed by the engine control unit according to the engine load and speed, supplies the amount of fuel that is fed to the high pressure pumps.
In this way the systems determines the pressure in the rail.
If the dispensing unit is not activated, spring (11) pushes piston (10) upwards. The flow from the delivery pump to the high-pressure pumps is opened to the maximum and a large quantity of fuel is fed to the high-pressure pumps.
The solenoid coil of the dispensing unit is activated by a pulse width modulated signal from the engine control unit. Depending on the degree of actuation, piston (10) alters the flow to the high-pressure pumps.
The following rule applies: **The higher the degree of activation, the less the quantity of fuel that is fed.**
The quantity of fuel that is not fed to the high-pressure pumps flows via the overflow valve back into the tank.
The engine control unit governs the rail pressure via the **Y091** - Dispensing unit (fuel) in conjunction with the **B086** - Rail pressure sensor. The dispensing unit is the actuator for the high-pressure control circuit.

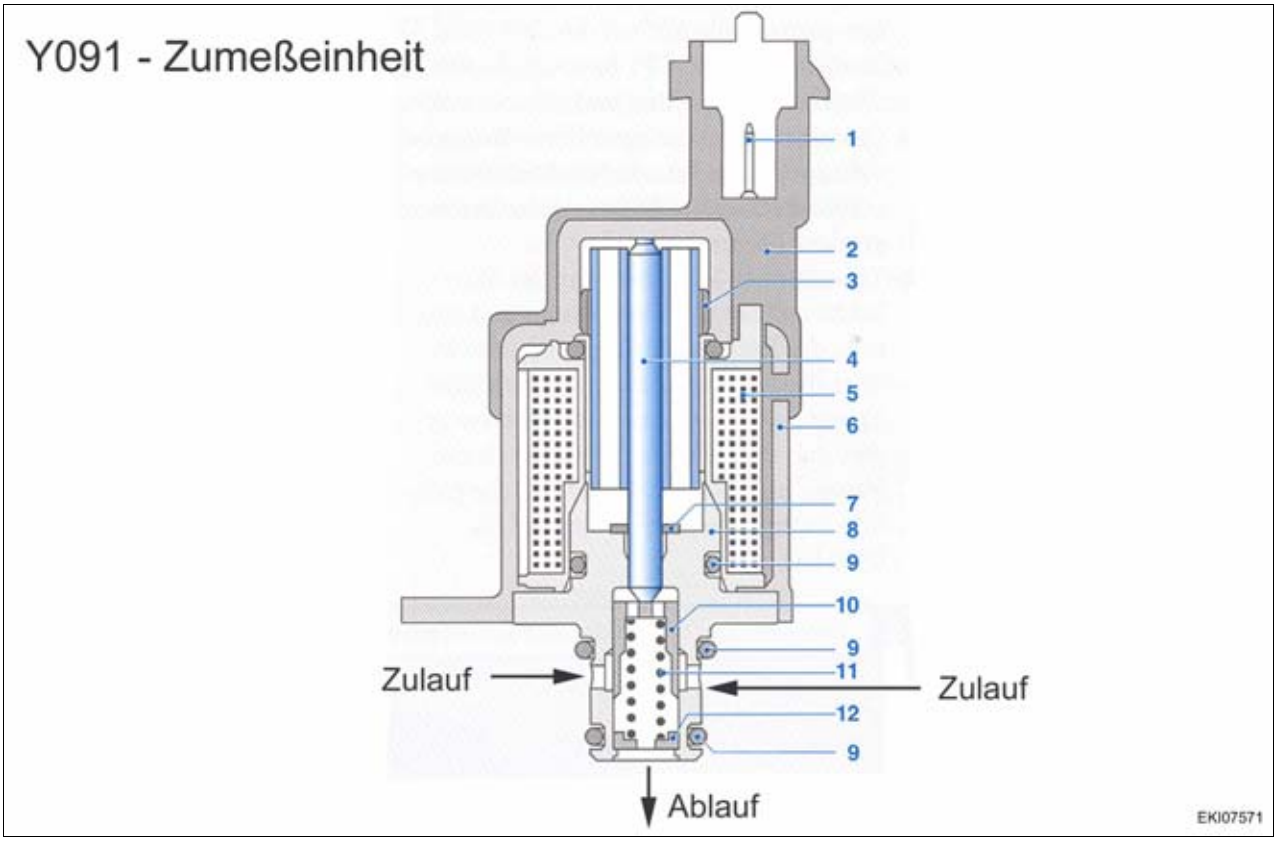


Fig. 11. I002243

Item	Designation	Item	Designation
1	X1662 separation point	7	Residual air disc
2	Housing	8	Solenoid core
3	Bearing	9	O-ring
4	Anchor with plunger	10	Piston with control slits
5	Winding with coil bobbin	11	Spring
6	Housing	12	Locking element

Piston (10) is actuated by magnetism and opens a flow cross-section depending on its position.
The Y091 solenoid valve is activated by a PWM signal (proportional solenoid)
Application of 0 VDC --> full flow from the pump

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.

6 High-pressure pump (PF 45)

DANGER: After switching off the diesel engine, wait at least 30 seconds before starting any work on the fuel system!

WARNING: Ensure the utmost cleanliness!
See Service Information 14/2007.

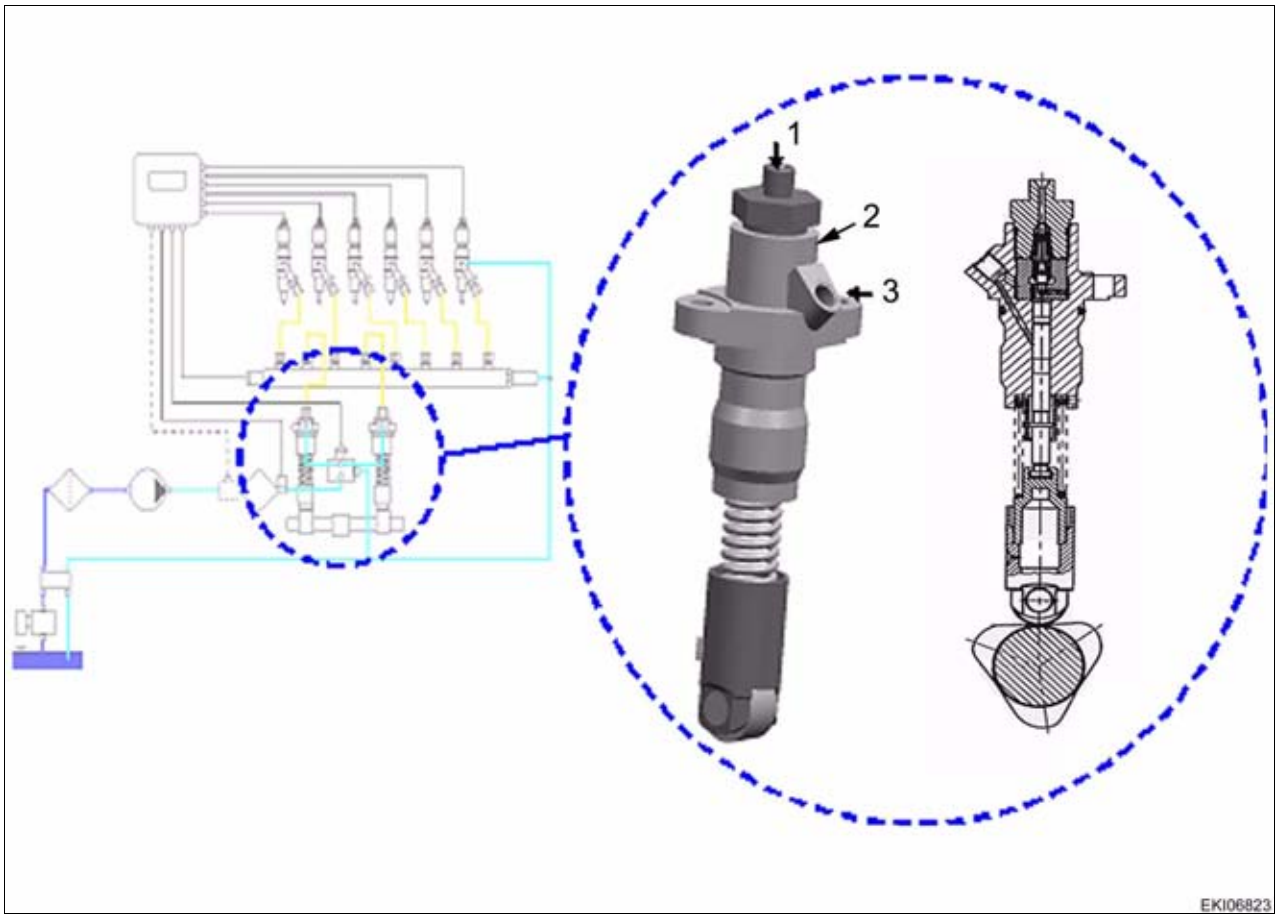


Fig. 12. I006259

The high-pressure pumps fulfil two functions.

– To draw in fuel
– To pump out fuel

High-pressure pumps deliver high fuel pressure and suppress fluctuations in the required drive torque.
The high-pressure pumps are driven from the camshaft by roller tappets. On 4-cylinder engines the camshaft has 2 cam blocks, each with 2 cam lobes. This is because 2 cylinders take their supply from each high-pressure pump.
On 6-cylinder engines the camshaft has 2 cam blocks, each with 3 cam lobes. This is because 3 cylinders take their supply from each high-pressure pump.
The high-pressure pump drives are lubricated with engine oil. For this reason the Deutz common rail system is approved for use with RME.

General conditions

– Hydraulic segregation of the high-pressure chamber during suction
– The high-pressure pumps can be filled only if the primary pressure is greater than 1,7 bar

7 High-pressure accumulator (rail)

DANGER: After switching off the diesel engine, wait at least 30 seconds before starting any work on the fuel system!

WARNING: Ensure the utmost cleanliness!
See Service Information 14/2007.

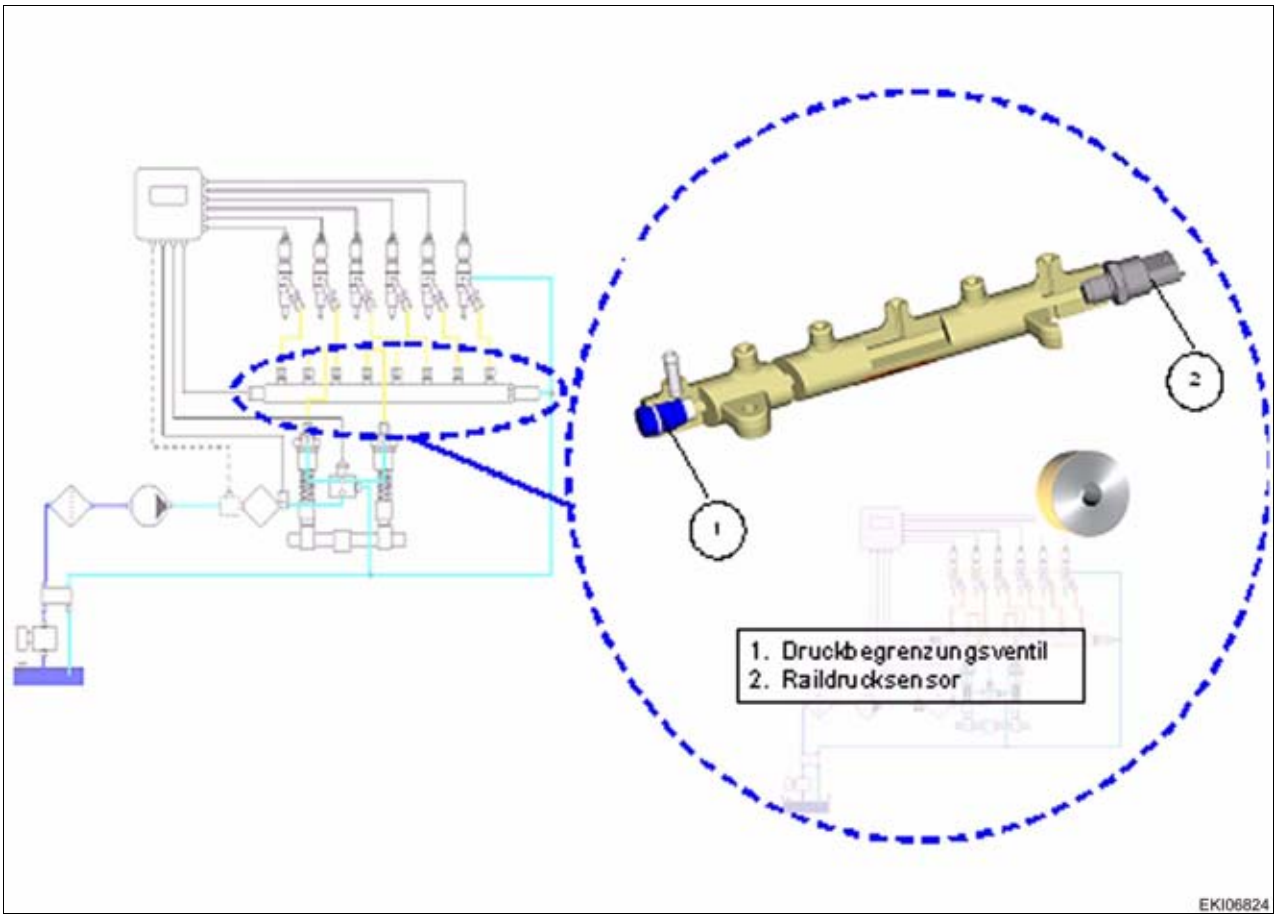


Fig. 13. I006261

1	High-pressure limiting valve	2	Rail pressure sensor

The high-pressure accumulator consists of the distribution rail and pipes to the injectors. The fuel is held at high pressure in the high-pressure accumulator. This damps the pressure fluctuations that arise from the pump deliveries and injection events. The pressure remains virtually constant, even when large quantities of fuel are being taken.

High-pressure limiting valve
The high-pressure limiting valve limits the maximum permitted fuel high pressure in the rail to approx. 1800 bar. This protects the high-pressure circuit from damage.
If the engine is running in emergency mode, the high-pressure limiting valve is deliberately opened. Opening the high-pressure limiting valve rapidly heats the fuel. Therefore the engine can run only a maximum of 4 minutes in emergency mode, after which it is shut down by the **A051** - ECU, engine control unit (EDC 7)..

B086 - Rail pressure sensor
The **A051** - ECU, engine control unit (EDC 7). reports the current rail pressure the rail pressure is regulated in conjunction with the dispensing unit.

NOTE: *B086 - Rail Drucksensor*
Aufbau und Funktion des Hochdruck - DBV
Hochdruck - DBV und Rail Drucksensor Aus- und Einbau
B086 - Rail Drucksensor
The rail pressure is displayed as a target and actual value in the Deutz "SERIDA" diagnostics program.

8 Design and function of the high-pressure limiting valve

DANGER: After switching off the diesel engine, wait at least 30 seconds before starting any work on the fuel system!

Duty:

- The high-pressure limiting valve limits the maximum permitted fuel high pressure in the rail (pressure accumulator) to approx. 1800 bar
- It enables emergency mode

Fig. 14. I002130

NOTE: *After the high-pressure limiting valve has been actuated approx. 30 times, it should be replaced. If leaks occur in the high-pressure limiting valve, the fuel is heated.*

Item	Designation
1	Valve insert
2	Valve piston
3	Low-pressure range (return)
4	Valve support
5	Pressure spring
6	Plate washer
7	Rail (high-pressure accumulator)

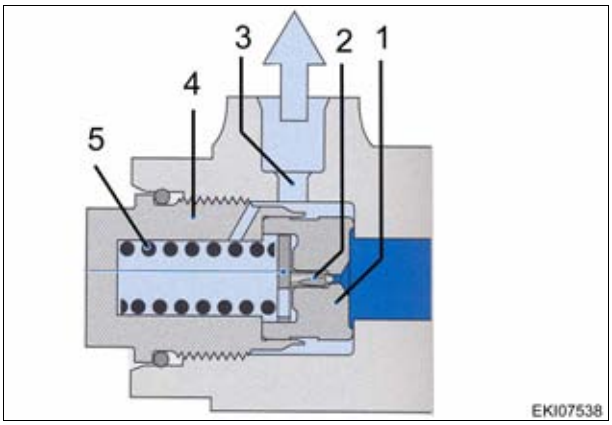


Fig. 15. I002131

The pressure-limiting valve is a mechanical component. It comprises the following parts.

- Housing with external thread for screwing onto the rail (high-pressure accumulator)
- Connection to the return pipe from the rail to the fuel tank (3)
- Movable piston (2)
- Pressure spring (5).

The side of the housing that faces the connection to the rail has a bore that is sealed by the conical end of a piston on the sealing seat in the inside of the housing.
If the maximum permitted high pressure (approx. 1800 bar) is exceeded, the valve piston (2) opens and the opening pressure is then present at the plate washer (6). The larger area causes the pressure in the rail to fall to approx 700 bar. The fuel flows back to the tank via return connection (3). When the fuel passes through the open high-pressure limiting valve, it is rapidly heated. Therefore the engine can run only a maximum of 4 minutes in emergency mode, after which it is shut down by the **A051** - ECU, engine control unit (EDC 7)..
The high pressure limiting valve cannot be closed whilst the engine is running; the engine must always be shut down, either by the **A051** - ECU, engine control unit (EDC 7). or by the driver.

If the diesel engine is switched off, the pressure-limiting valve closes after approx. 30 seconds.
If the **A051** - ECU, engine control unit (EDC 7). detects a fault in the fuel system, it initiates emergency mode.

Warning message **High-pressure limiting valve opened**
A fault code FC 1E.1.51 is logged

9 Y095 to Y101 injector valves 1 to 6

DANGER: After switching off the diesel engine, wait at least 30 seconds before starting any work on the fuel system!

WARNING: Ensure the utmost cleanliness!
See Service Information 14/2007.

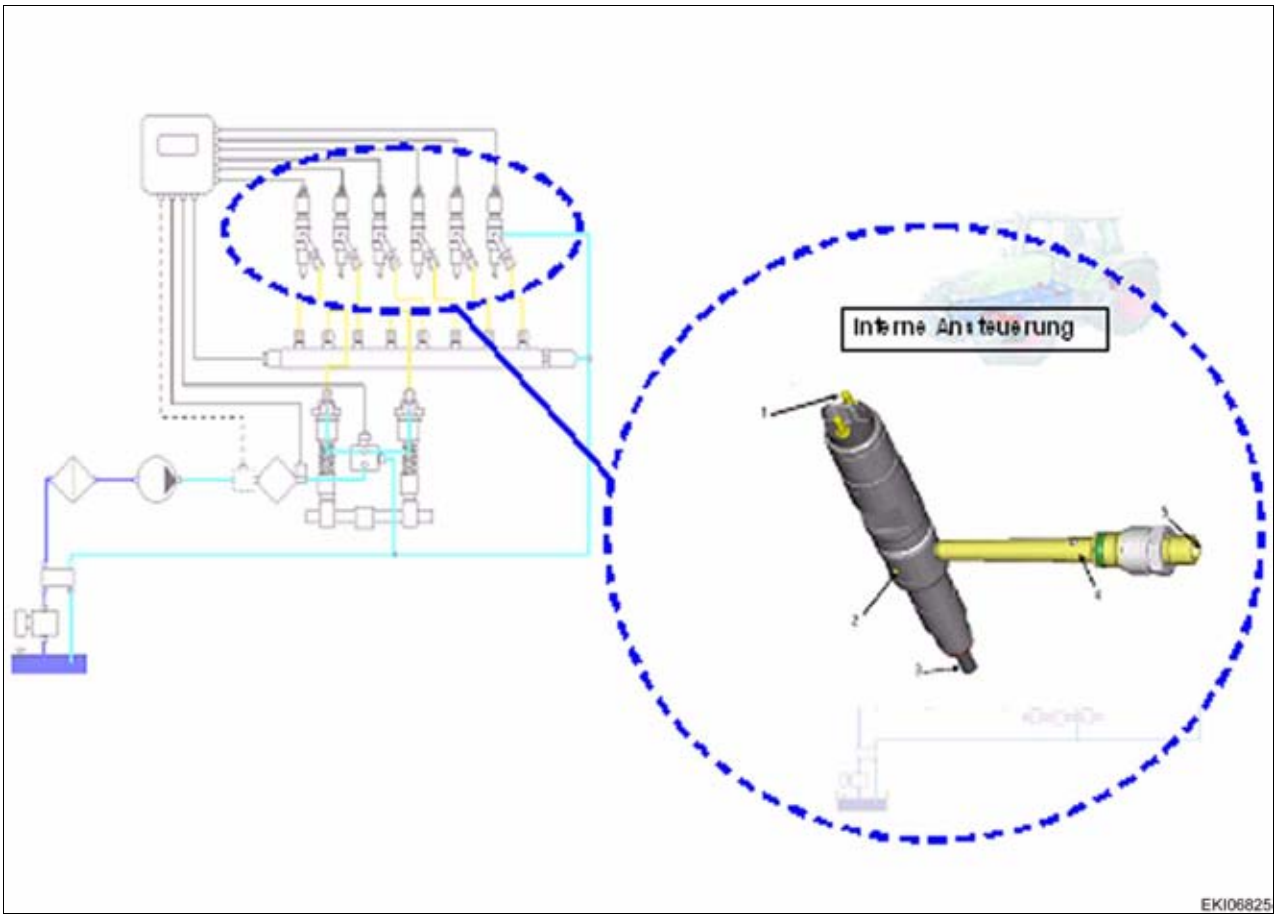


Fig. 16. I006262

Item	Designation	Item	Designation
1	Electrical connection	4	External high-pressure connection
2	Return flow	5	High-pressure connection from rail
3	Nozzle		

Cutaway views: Injector valve (injector)

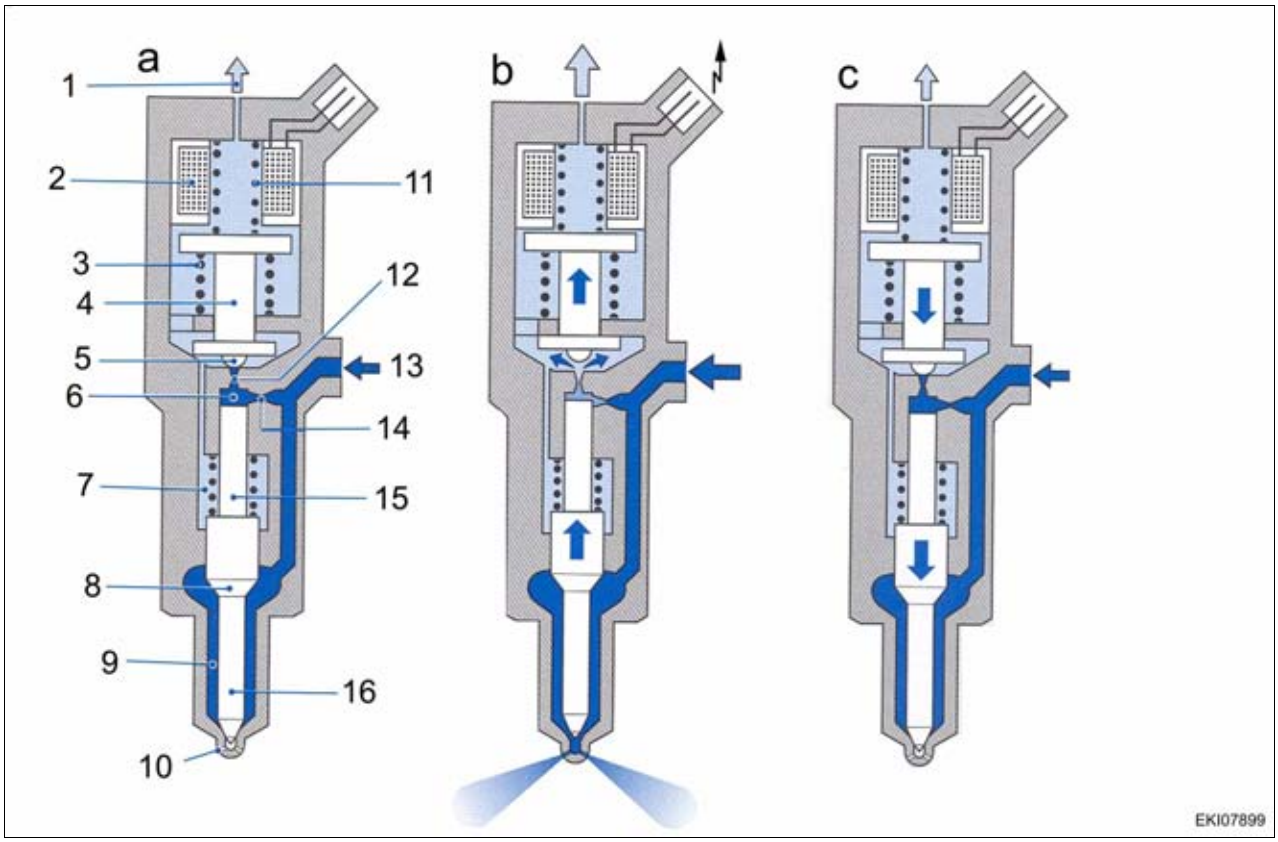


Fig. 17. I002264

Item	Designation	Item	Designation
a	Idle state	7	Injection nozzle spring
b	Injector valve (injector) opens	8	Exposed annular surface of the injection nozzle needle
	"Start of injection"		
c	Injector valve (injector) closes	9	Chamber volume
	"End of injection"	10	Injection nozzle hole (multihole nozzle)
1	Fuel return	11	Solenoid valve spring
2	Solenoid coil	12	Outlet restrictor
3	Overstroke spring	13	High-pressure connection
4	Ignition armature	14	Inlet restrictor
5	Valve ball	15	Valve piston (control piston)
6	Valve actuation chamber	16	Injection nozzle needle

Functional description: Injector valve (injector)

Idle state (a)

Fuel is delivered from the high-pressure accumulator (rail) to high-pressure connection (13) and flows via inlet restrictor (14) to valve actuation chamber (6) and delivery chamber volume (9). Rail pressure is present in both chambers. The additional force generated by nozzle spring (7) (50N) prevents the injector opening even when rail pressure is not yet present.

Injector opens - "start of injection" (b)

Energising solenoid coil (2) (approx. 20 A) generates an opening force in ignition armature (4) that overcomes the closing force generated by solenoid valve spring (11). The high current of 20 amps ensures that the injector opens quickly. When the closing force is overcome, valve ball (5) opens the discharge bore (0.26 mm) and the fuel pressure in the valve actuation chamber (6) is discharged. The small amount of fuel used to open the injector flows back into the tank via the fuel return pipe.

Every time the injector opens, this small amount of fuel flows via the fuel return pipe.

After the maximum stroke has been achieved (approx. 50 µm), the current is reduced after 0.3 ms after start of actuation to the retention current of approx. 12 A.

Injector closes - "end of injection"
The A051 ECU, engine control unit (EDC 7) switches off the holding current. When the current is less than the switch-off value (approx. 8 A), the solenoid valve closes and injection nozzle needle (16) closes.
The fuel volume in the solenoid valve chamber damps the vibration of the ignition armature. The pressure in fuel return (1) and the pressure in the solenoid valve chamber should be 0.3 - 1.0 bar, so as to ensure sufficient damping properties. If the pressure is higher than this, the damping will be too great and can impair the quantity metering.

Forces, clearances and fuel quantities on the injector valve (injector)

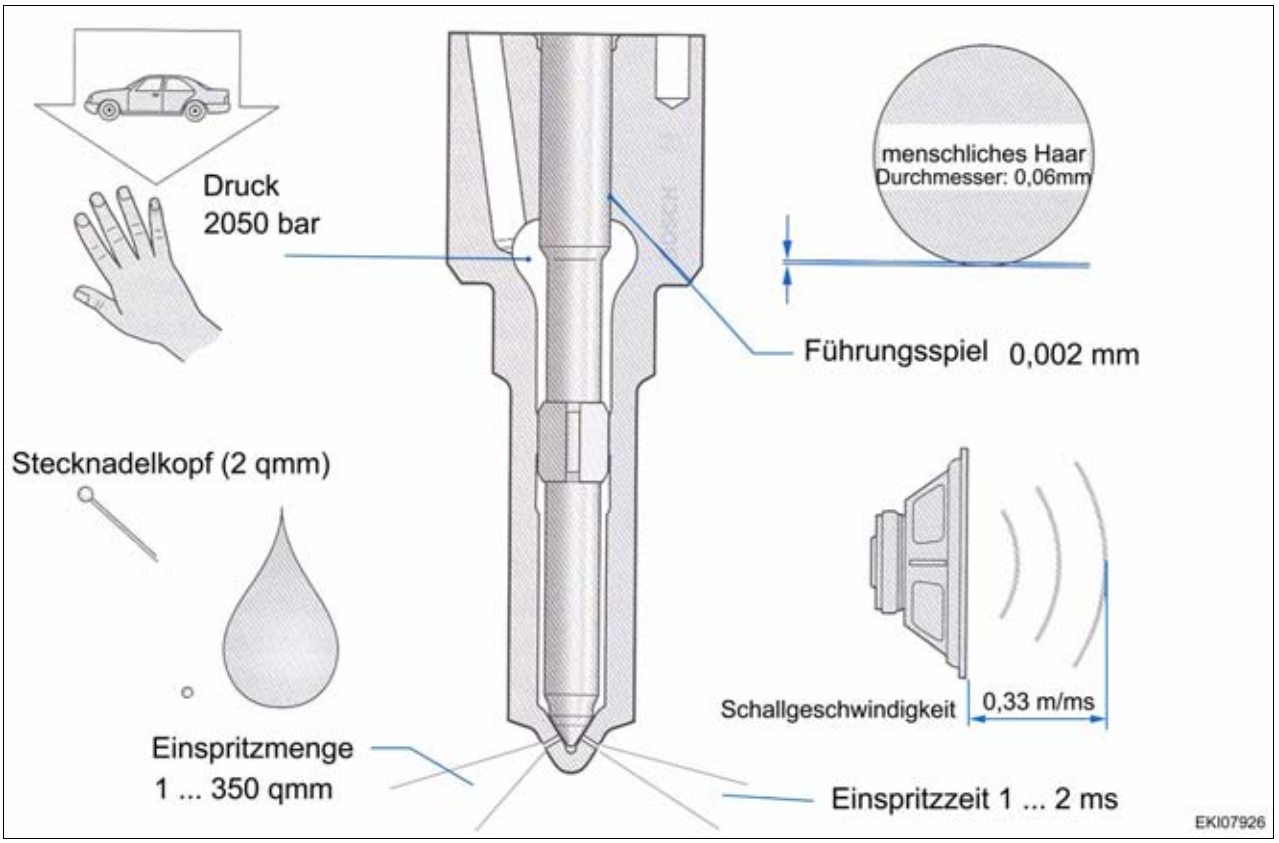


Fig. 18. I002265

Installation of injector valve (injector)

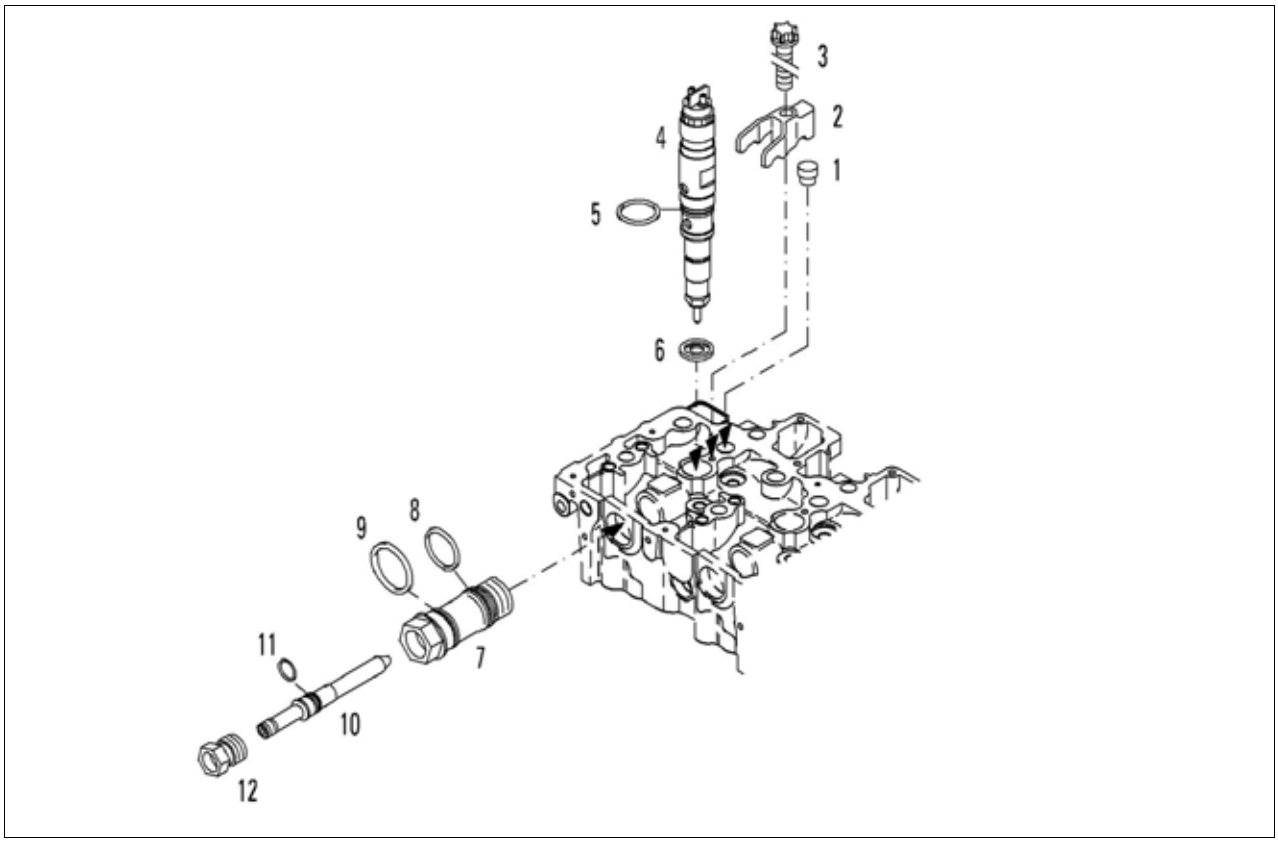


Fig. 19. I002145

Item	Designation	Item	Designation
1	Cover	7	Pressure pipe
2	Clamping shoe	8	O-ring seal
3	Torx screw	9	O-ring seal
4	Injector valve (injector) Y095 injector valve (1 cylinder) (on flywheel)	10	Edge-type filter
5	O-ring seal	11	O-ring seal
6	Sealing washer	12	Union nut

NOTE: *See also: DEUTZ TCD 2013 L06 V4 workshop manual*

NOTE: *see §158*

E Measuring and testing

1 Measuring fuel return pressure 29
2 Measuring fuel low pressure 32
3 Measuring fuel pressure at Y091 dispensing unit 34

1 Measuring fuel return pressure

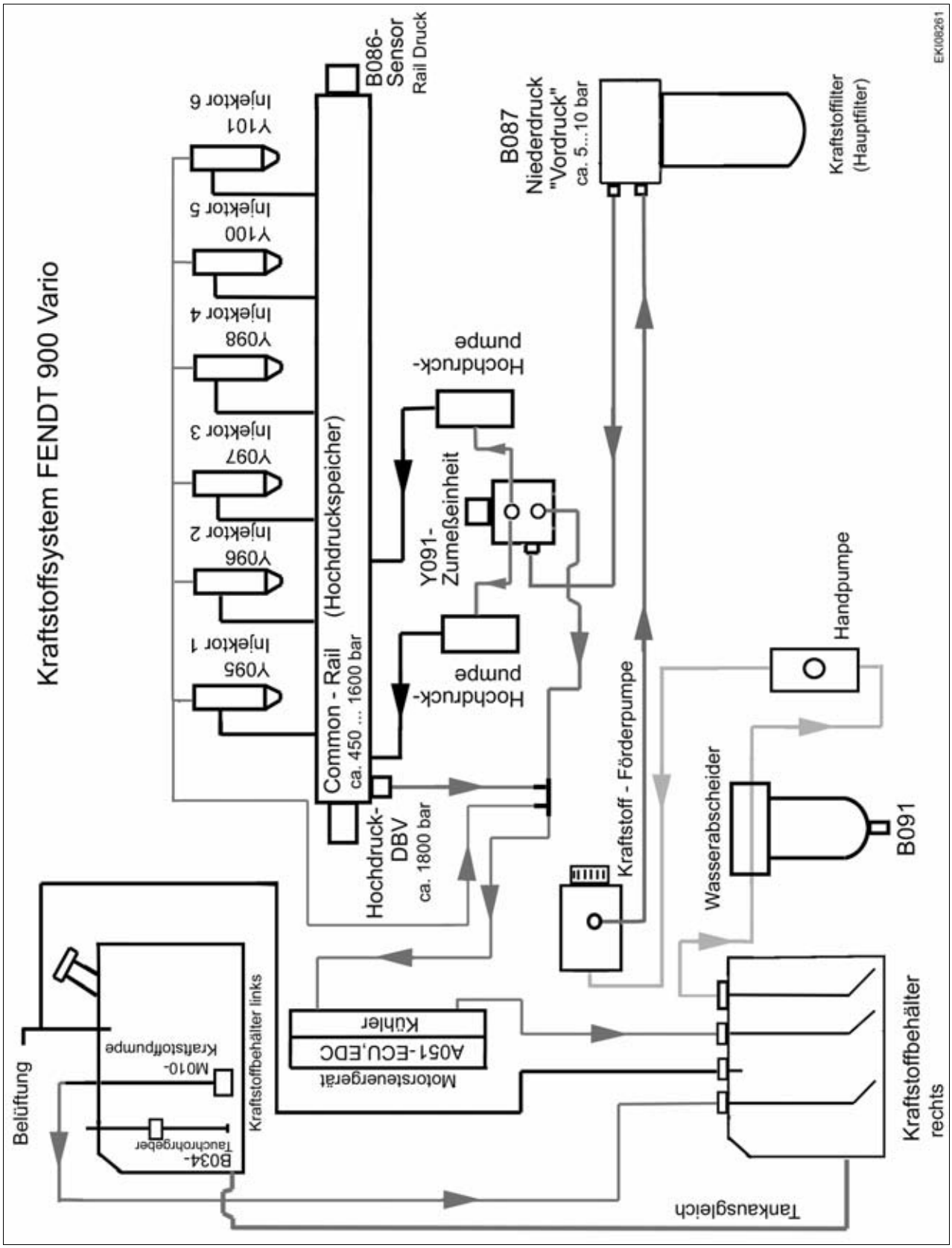


Fig. 1. I002008

If error code **1E.1.53** (Rail pressure outside target range) is displayed, the problem may be with the return line. For example, if the return line is blocked or kinked, the return pressure increases.

If the pressure in the return line is too high, the pressure in the dispensing unit also rises. This causes too much fuel to be delivered to the high pressure pumps, which means that the pressure in the rail is above the value set by the engine control unit (A051).
Therefore, if this error occurs, the return pressure must be measured and the target and actual rail pressures must be compared using SERDIA at the same time.

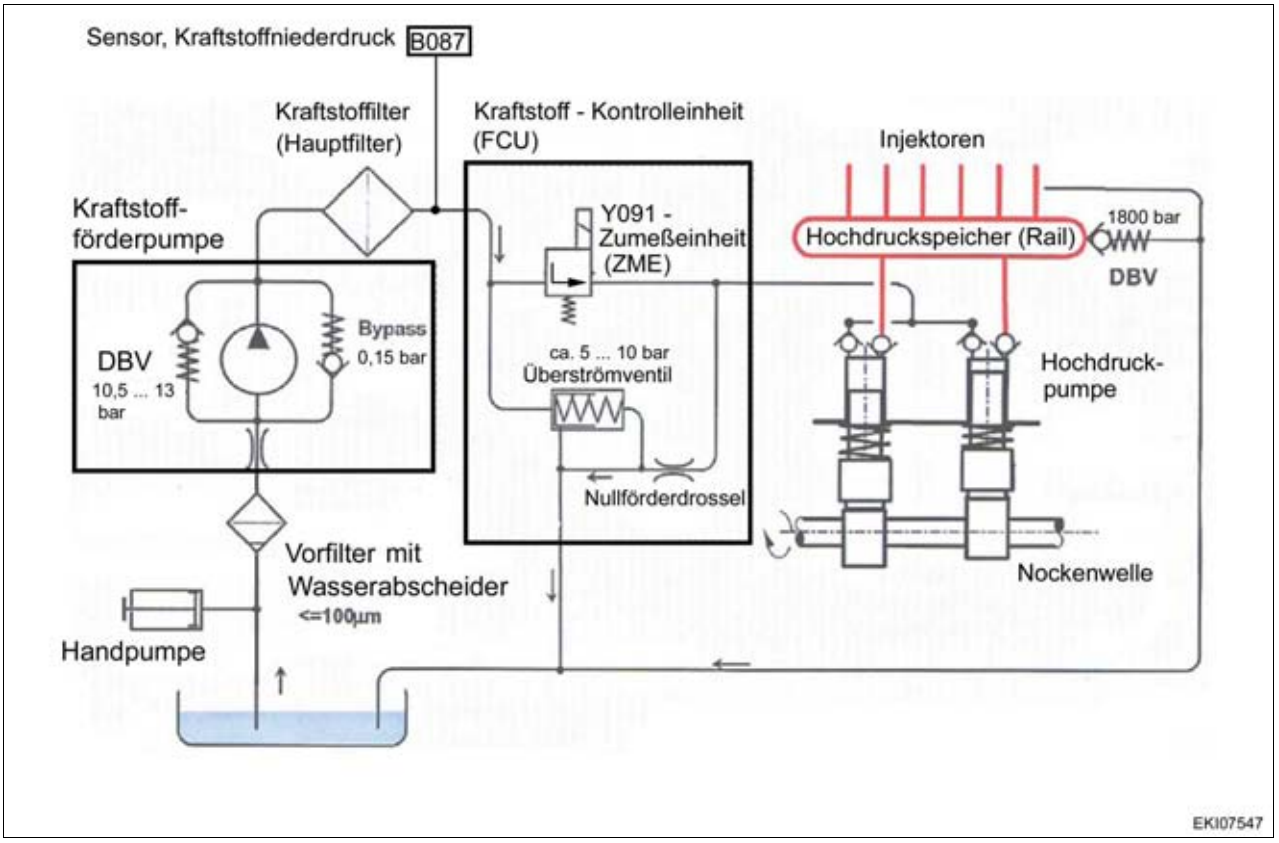


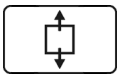
Fig. 2. I001583

Remove the banjo bolt from the return pipe, screw in banjo bolt with measuring connection 199.110.620.010 and connect a pressure gauge (-1 bar to +1.5 bar)
Target pressure: 0.2-0.5 bar

Fig. 3. I003558

Connect SERDIA adapter (level 3) to X810 diagnostics socket and launch the program

Cab, on the right mudguard



Remove cover.

Fig. 4. I003168

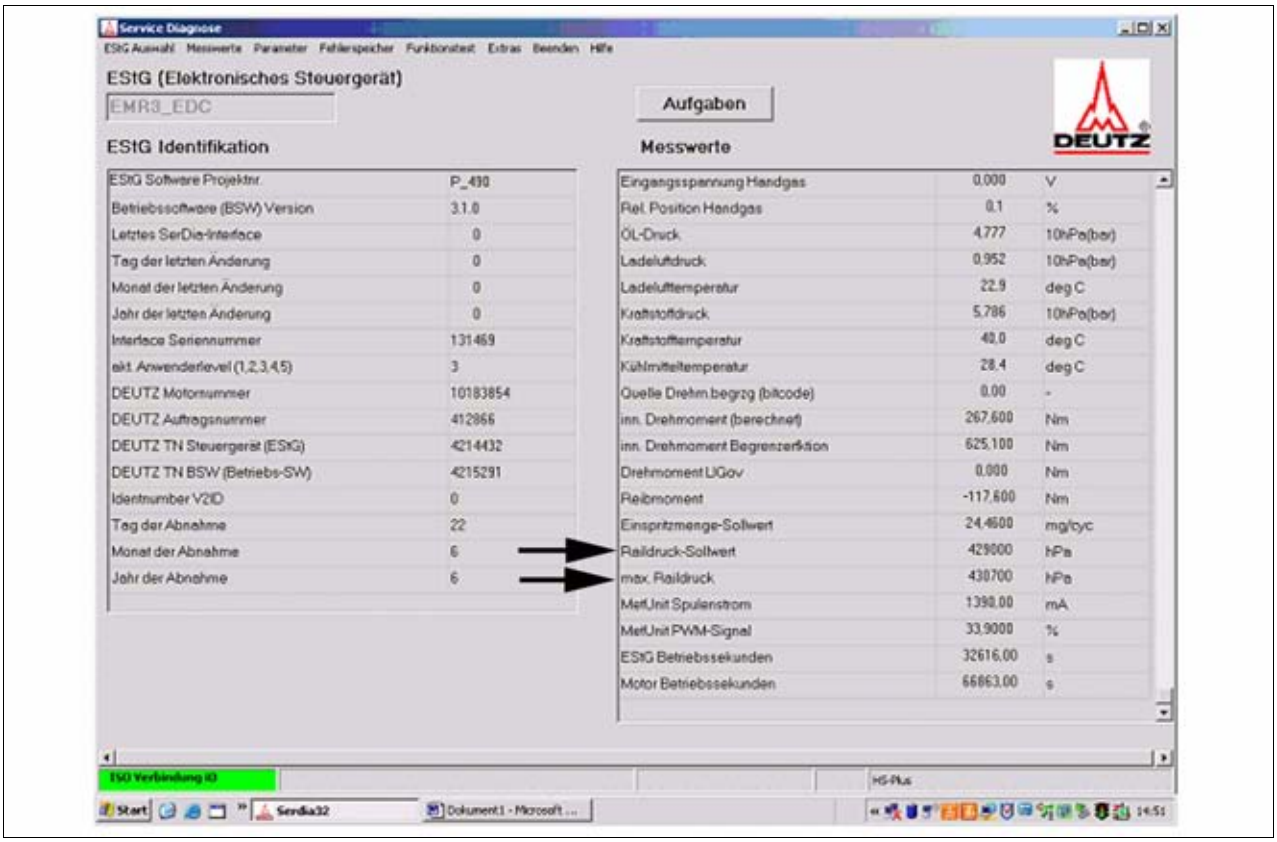


Fig. 5. I003557

In the list, find the two values for **rail pressure target value** and **max. rail pressure** (see arrows), and compare these two values

If the return pressure is greater than 0.5 bar and the max. rail pressure is greater than the rail pressure target value, the fuel return system must be checked.
First check whether the return lines are kinked. If nothing is observed there, the components must be removed from the return system one after the other. First disconnect the return line from the engine control unit (A051) and connect it directly to the tank, then repeat the measurement. If the pressure is correct now, the problem lies in the cooler duct of the engine control unit. If the pressure is still incorrect, proceed as described above with the next component.

2 Measuring fuel low pressure

Measuring fuel low pressure "primary pressure" (B087 sensor)

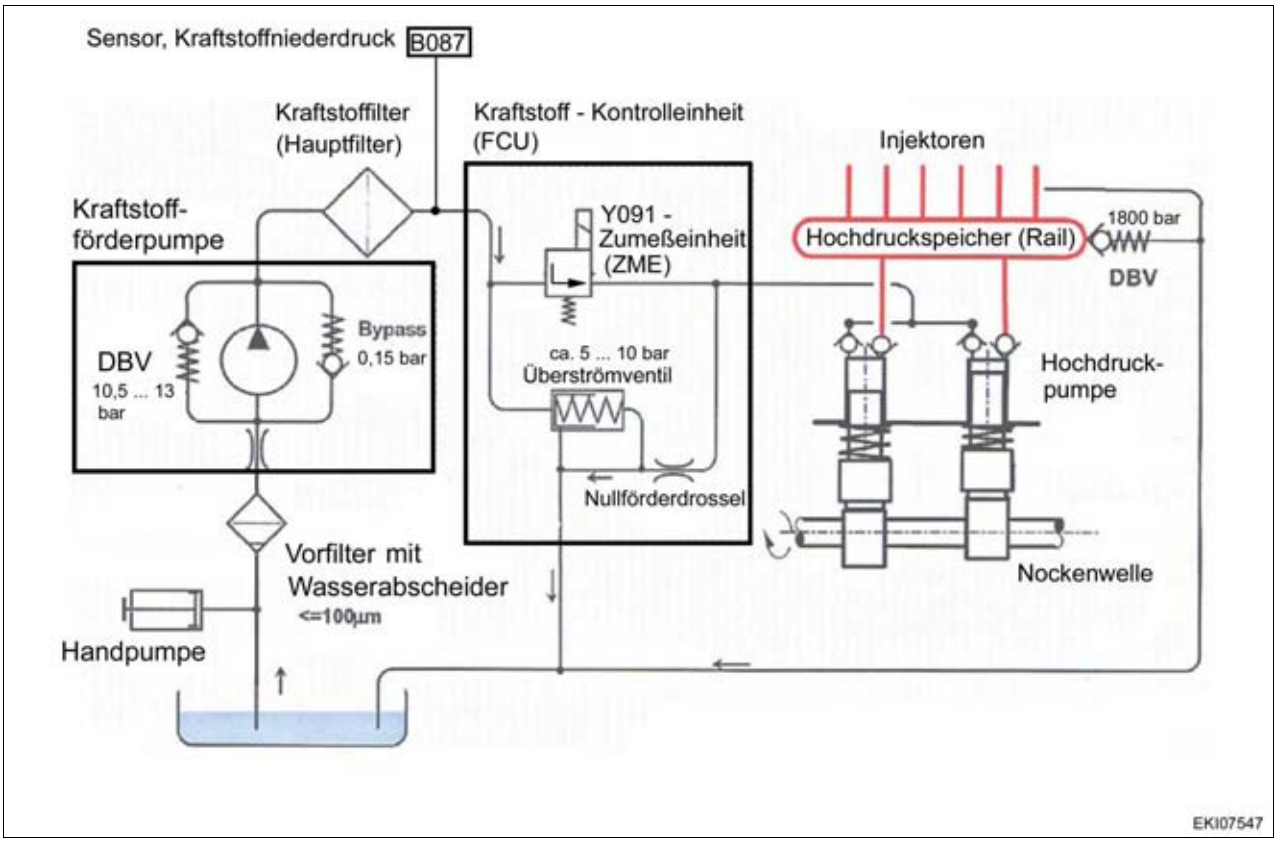


Fig. 6. I001583

Connect pressure gauge (measuring range: 15 bar) to the feed of the **Y091** - Dispensing unit (fuel)

Fig. 7. I002046

Note: the fuel low pressure is influenced by the fuel temperature	
Fuel low pressure "primary pressure" (at operating temperature)	**Signal from B087 sensor**
0 bar	Approx. 0.5 VDC
approx. 6 bar (regardless of engine speed)	Approx. 3.8 VDC

If the target fuel low pressure value (approx. 6 bar) is not reached:

– Fuel starvation
– Fuel filter (main filter) clogged
– Water sedimentor (pre-filter) contaminated
– Hand pump leaking
– Fuel pump leaking

Fig. 8. I002046

NOTE: *Bleed the fuel system, if necessary*
see §2

3 Measuring fuel pressure at Y091 dispensing unit

Checking fuel pressure (low pressure) at the Y091 dispensing unit

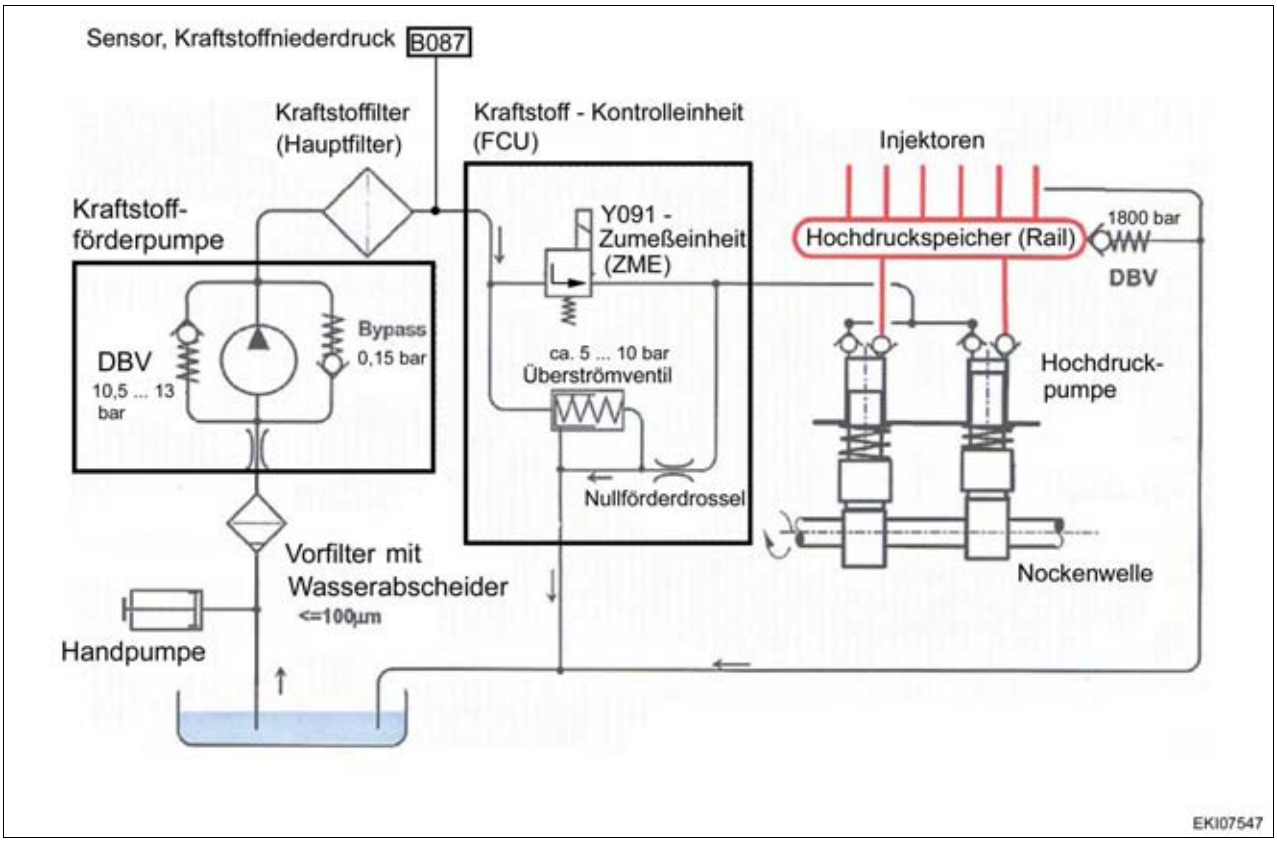


Fig. 9. I001583

Checking fuel pressure (low pressure) upstream of Y091 dispensing unit (ZME)
Screw measuring connection into the fuel filter housing.
Connect pressure gauge with measuring range 0 -25 bar.
Target value: ca. 6 bar to 10 bar

Checking fuel pressure (low pressure) downstream of Y091 dispensing unit (ZME)
Attach adapter with measuring connection downstream of the Y091 dispensing unit.
Connect pressure gauge with measuring range0 bar to 25 bar.
Target value: depends on engine load.
Y091 dispensing unit fully energised "idle" (dispensing unit almost completely closed): approx. 1 bar
Y091 dispensing unit de-energised "full load" (dispensing unit fully open): approx. 5 bar– 10 bar

Fig. 10. I002374

Note: Testing is carried out with diesel engine not under load.		
	Fuel pressure upstream of Y091 dispensing unit	**Fuel pressure downstream of Y091 dispensing unit**
Diesel engine not under load Idling (800 rpm)	approx.6 bar (overflow valve opens)	approx. 1 bar
At no-load engine speed (2200 rpm)	approx. 6 bar (overflow valve opens)	approx. 1 bar

Note: Testing is carried out with diesel engine not under load.		
	Fuel pressure upstream of Y091 dispensing unit	**Fuel pressure downstream of Y091 dispensing unit**
Energise Y091 dispensing unit with 12 VDC from external source. Y091 dispensing unit completely closed.	Approx.6 bar	approx. 0 bar (diesel engine dies)
Y091 dispensing unit de-energised (unplug connector) Y091 dispensing unit fully open	Approx.6 bar	Approx.6 bar
Note: In this test the diesel engine switches to emergency mode (emergency running approx. 4 minutes).		

Energise Y091 dispensing unit with 12 VDC from external source.
Y091 dispensing unit fully closed –> the diesel engine dies.

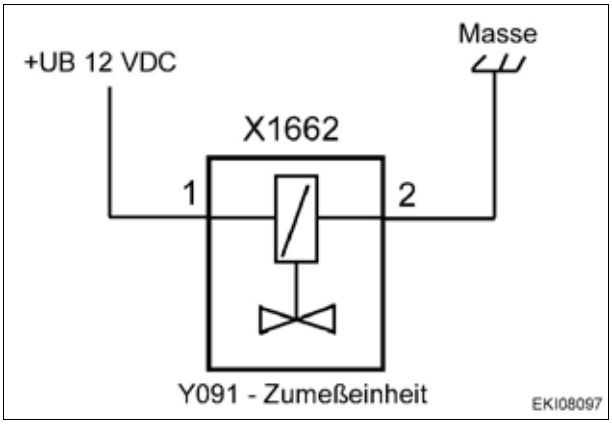


Fig. 11. I001834

Diesel engine emergency mode

The Y091 dispensing unit is de-energised, i.e. fully open.
This causes the high-pressure limiting valve to open.
When idle, this produces a pressure of approx. 400 bar

Fig. 12. I001172

When the high-pressure limiting valve opens, the warning message **"High-pressure limiting valve opened"** is displayed on the A007 instrument panel.
Since high pressure (approx. 400 bar) is relieved via the pressure-limiting valve, the fuel is heated.
Therefore, the diesel engine is switched off automatically by the A051 ECU, engine control unit after approx. 3 minutes.

Restart tractor
Switch off ignition.
Wait at least 30 seconds until the pressure in the rail (high-pressure accumulator) has dissipated.
Start tractor.

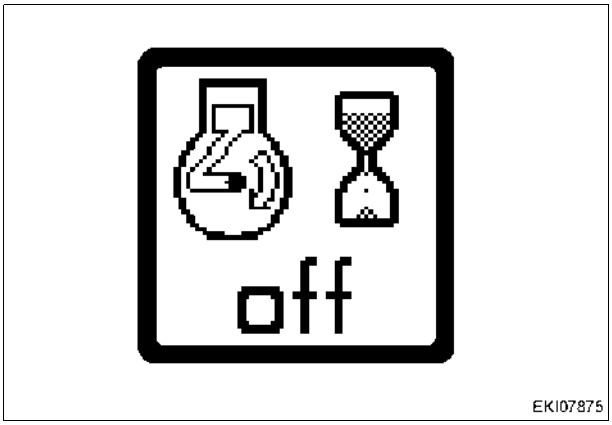


Fig. 13. I001561

NOTE: *When the high-pressure limiting valve opens, the return line (arrowed) heats up.*
The diesel engine is switched off by the A051 ECU, engine control unit after approx. 3 minutes.

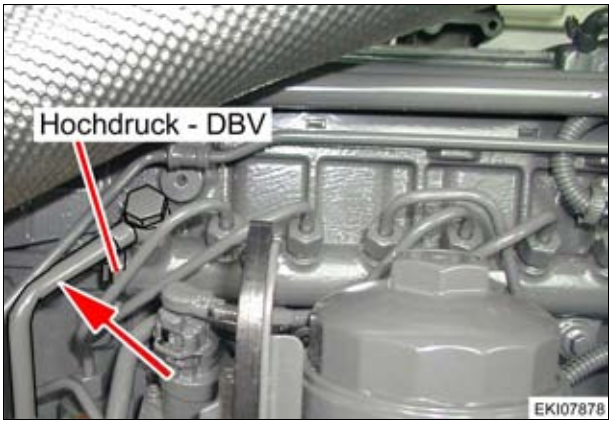


Fig. 14. I001560

G Repair

1 Water sedimentor: drain water 39
2 Bleeding air from the fuel system 41
3 Removing and installing the high-pressure limiting valve and rail pressure sensor 43

1 Water sedimentor: drain water

Drain water and dirt
Version I

Drain water and dirt

Turn off the engine.
Open vent plug (A).
To open drain plug (B), press in and turn.
Drain water and dirt. Catch it with a drain pan and dispose of in an environmentally compatible manner.
Close vent plug (A).
Close drain plug (B).
Start engine, check fuel filter for leaks.

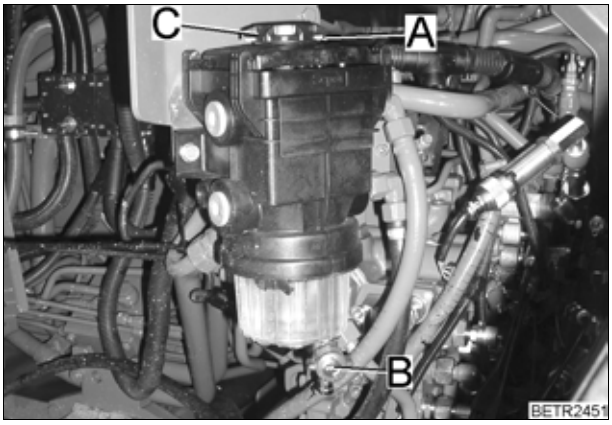


Fig. 1. I001585

Change filter (as required, if engine performance starts to fall)

Turn off the engine.
Disconnect the fuel supply line.
Unscrew the filter cap (C).
Remove the filter, insert new filter.
Screw filter cap (C) tight.
Start engine, check fuel filter for leaks.

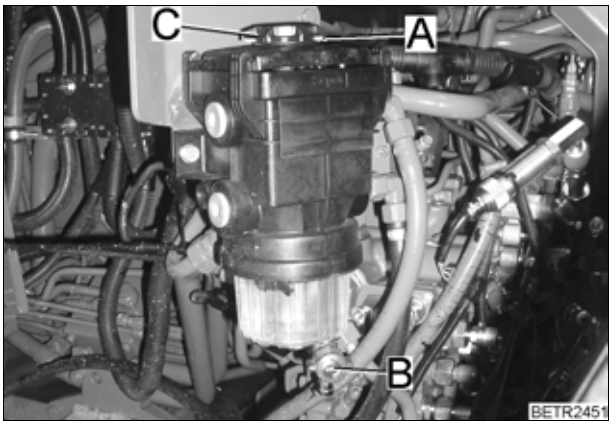


Fig. 2. I001585

Version II

Drain water and dirt

Turn off the engine.
Open vent plug (A).
Open drain plug (B)
Drain water and dirt. Catch it with a drain pan and dispose of in an environmentally compatible manner.
Close vent plug (A).
Close drain plug (B).
Start engine, check fuel filter for leaks.

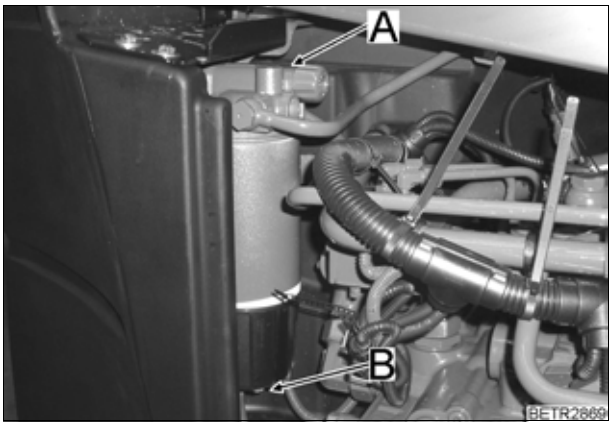


Fig. 3. I007579

Change filter (as required, if engine performance starts to fall)

Turn off the engine.
Disconnect the fuel supply line.
Disconnect connector, unscrew filter cap (A).
Unscrew and remove filter cartridge (B).
Lightly oil the seals or spray with diesel.
Tighten filter cartridge (B) by hand until the seal makes contact.
Screw down filter cartridge (B) manually by another half turn (18 Nm).
Connect connecter, screw on filter cap (A).
Bleed air from the fuel system.
Start engine and check fuel pre-filter for leaks.

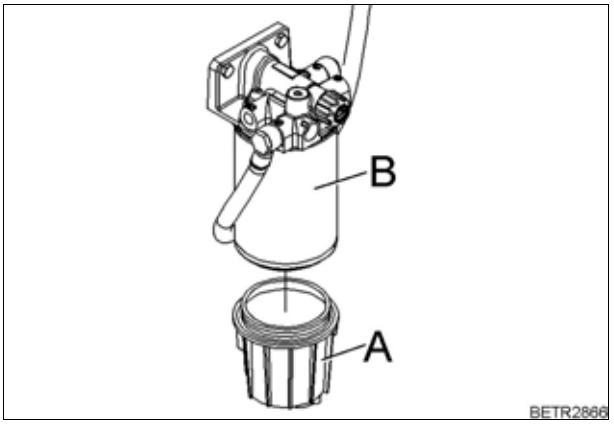


Fig. 4. I007576

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-

2 Bleeding air from the fuel system

Bleeding air from the fuel system

DANGER: High-pressure lines must not be opened, as the common rail system is permanently pressurised and serious injuries may result.

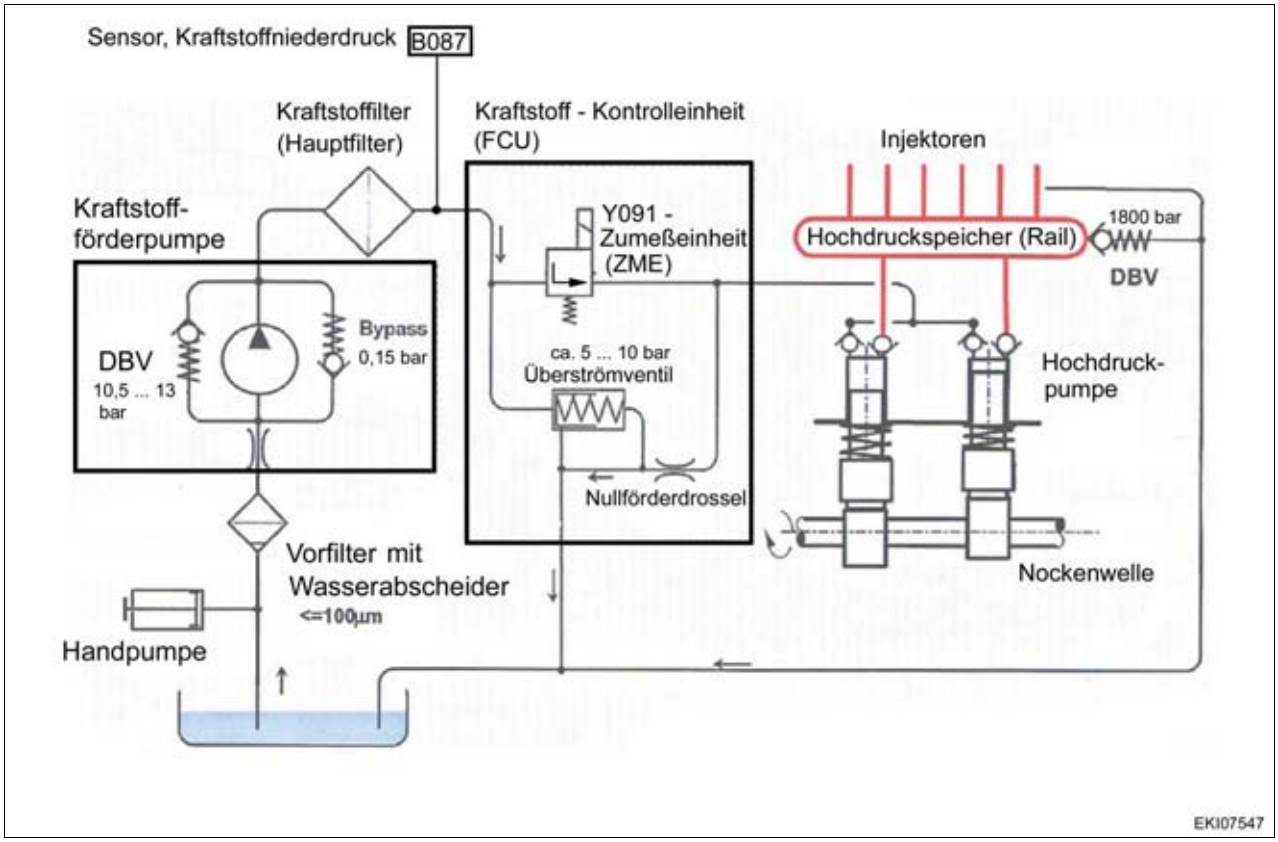


Fig. 5. I001583

Version I

Prime with the hand pump (A).

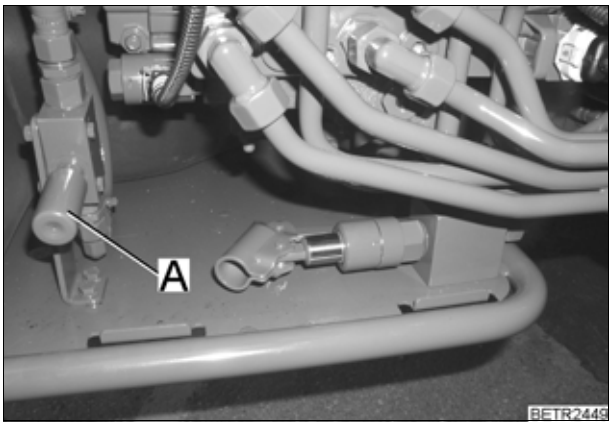


Fig. 6. I001584

If necessary, bleed the low pressure circuit:
vent plug (A) Unscrew
Prime with the hand pump until fuel is discharged without any air bubbles.
Close vent plug (A).

A	**Vent plug**
B	Water drain plug
C	Filter cap

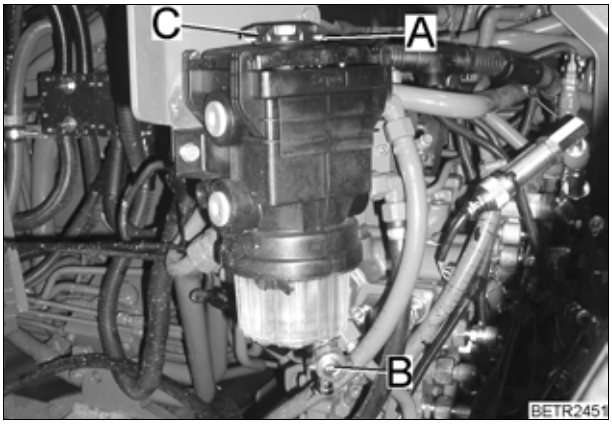


Fig. 7. I001585

Pump the hand pump (A) until strong resistance is felt, then continue pumping for a few more strokes.
Start the engine, allow to warm up for max. 30 seconds.

NOTE: *Air in the high-pressure system may result in unacceptable pressure fluctuations in the common rail system.*
Therefore, the tractor should be operated under low load for about 5 minutes.

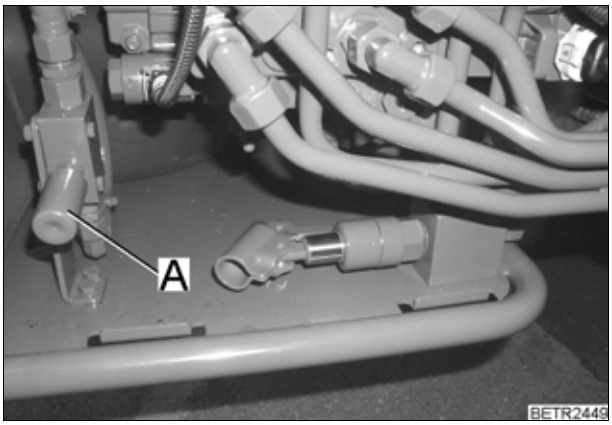


Fig. 8. I001584

Version II

Open bleed screw (A) for the fuel pre-filter.
Keep pumping with manual delivery pump (B) until strong resistance is felt; pump on for a few strokes after this.
Close the bleed screw for the fuel pre-filter.
Start engine.

NOTE: *Air in the high-pressure system may result in unacceptable pressure fluctuations in the common rail system.*
Therefore, the tractor should be operated under low load for about 5 minutes.

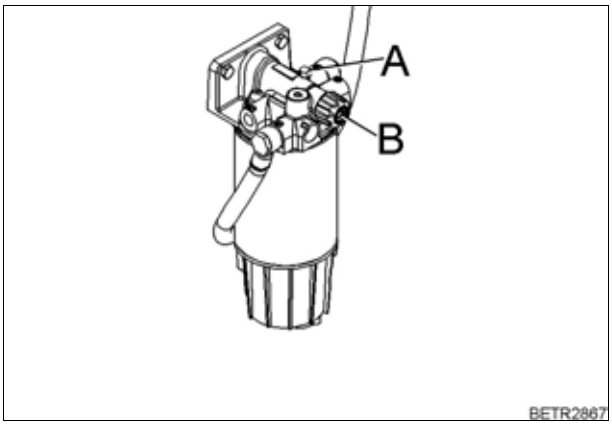


Fig. 9. I007578

3 Removing and installing the high-pressure limiting valve and rail pressure sensor

DANGER: After switching off the diesel engine, wait at least 30 seconds before starting any work on the fuel system!

WARNING: Ensure the utmost cleanliness! See Service Information 14/2007.

Removing and fitting the high-pressure limiting valve

The high-pressure limiting valve limits the maximum permitted fuel high pressure in the rail (pressure accumulator) to approx. 1800 bar

NOTE: *After the high-pressure limiting valve has been actuated approx. 30 times, it should be replaced.*
*In case of leaks in the high-pressure limiting valve, the fuel is heated. The **B086** - Rail pressure sensor and the high-pressure limiting valve must always be replaced at the same time!*

Fig. 10. I001562

Unscrew and remove the high-pressure limiting valve from the rail.

NOTE: *Collect any escaping fuel.*

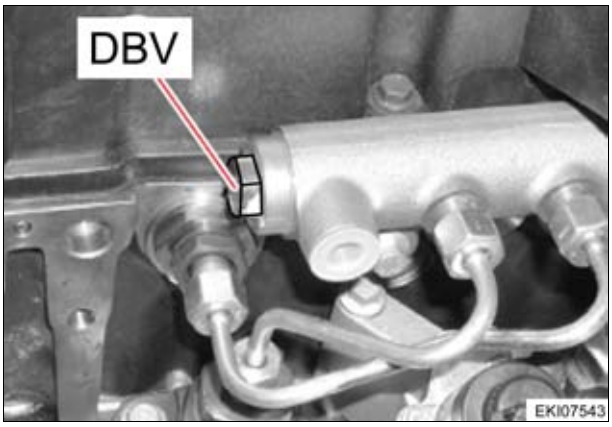


Fig. 11. I001564

Check thread and sealing lip for damage (arrowed).

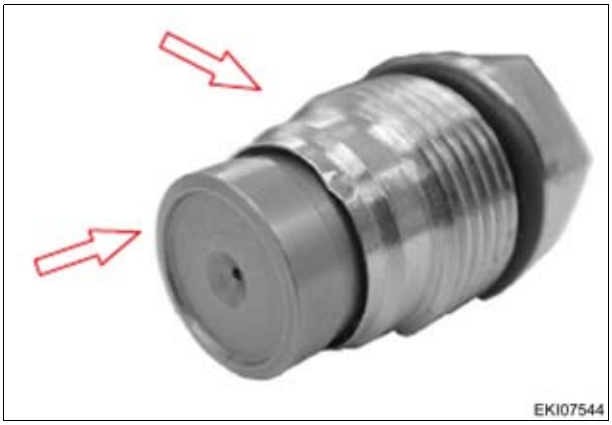


Fig. 12. I001565

Carefully remove O-ring seal.

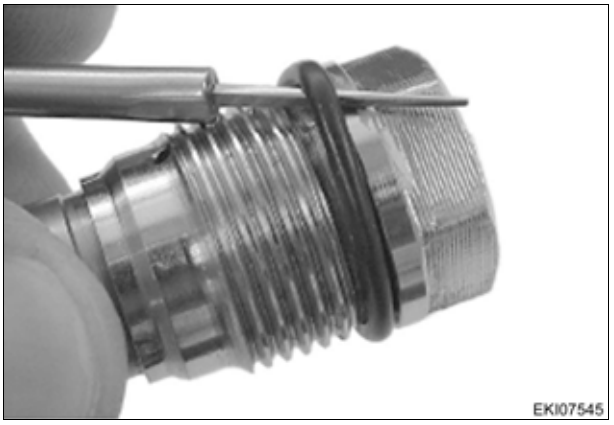


Fig. 13. I001569

Fit a new O-ring seal (arrowed).

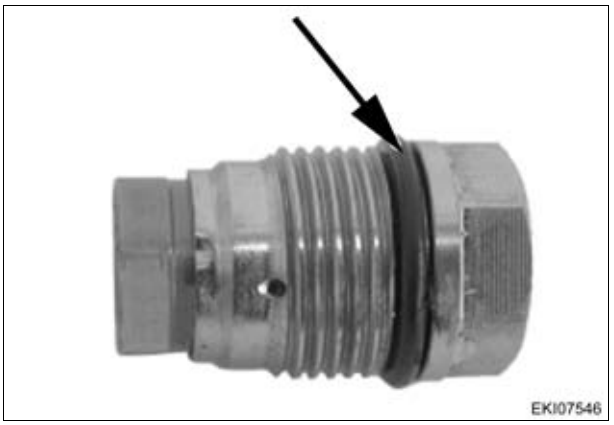


Fig. 14. I001570

Apply a thin coat of X 902.002.472 high-pressure grease for long-term lubrication to the thread and sealing lip of the pressure-limiting valve

Fig. 15. I001565

Fit the pressure-limiting valve with new O-ring seal and tighten to a torque of **100 Nm.**

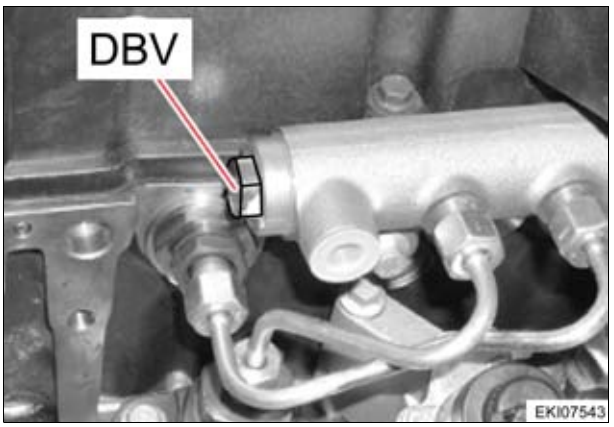


Fig. 16. I001564

Removing and fitting the **B086** - Rail pressure sensor

Unplug the X1655 separation point.
Remove the B086 sensor.

NOTE: *Collect any escaping fuel.*

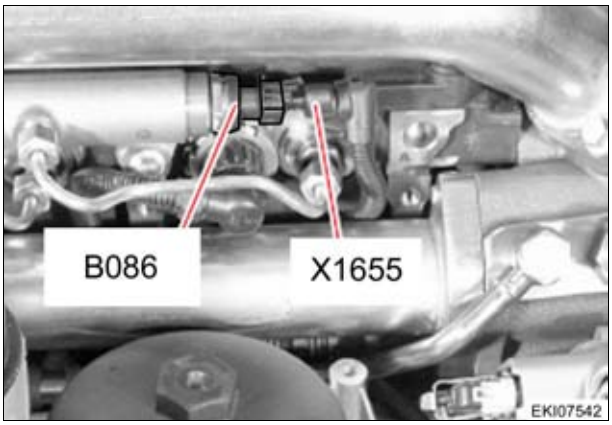


Fig. 17. I001566

NOTE: *To avoid electrostatic discharge, do not touch the contact pins on the **B086** - Rail pressure sensor with bare hands*

Check the thread and sealing lip for damage (arrows).
Apply a thin coat of X 902.002.472 high-pressure grease for long-term lubrication to the thread and sealing lip of the B086 sensor

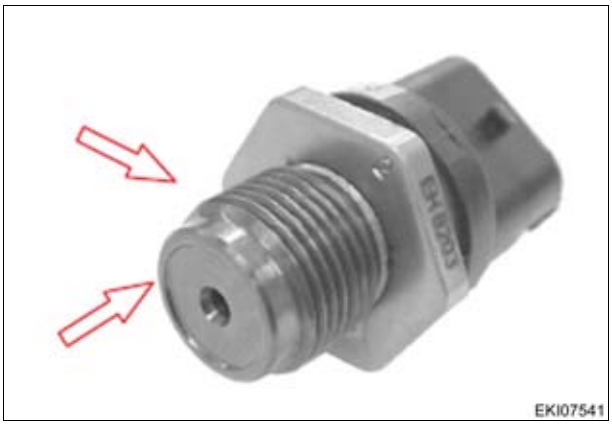


Fig. 18. I001567

Fit B086 sensor and tighten to a torque of **70 Nm.**
Plug in the X1655 separation point.

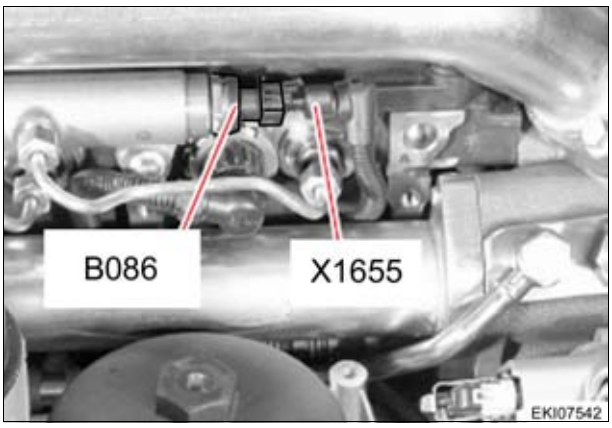


Fig. 19. I001566

NOTE: *see §2*

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

2210

Engine/crankcase

2210 Engine/crankcase

G Repair 5

G Repair

1 Crankcase air bleed: Deutz TCD 2013 7

1 Crankcase air bleed: Deutz TCD 2013

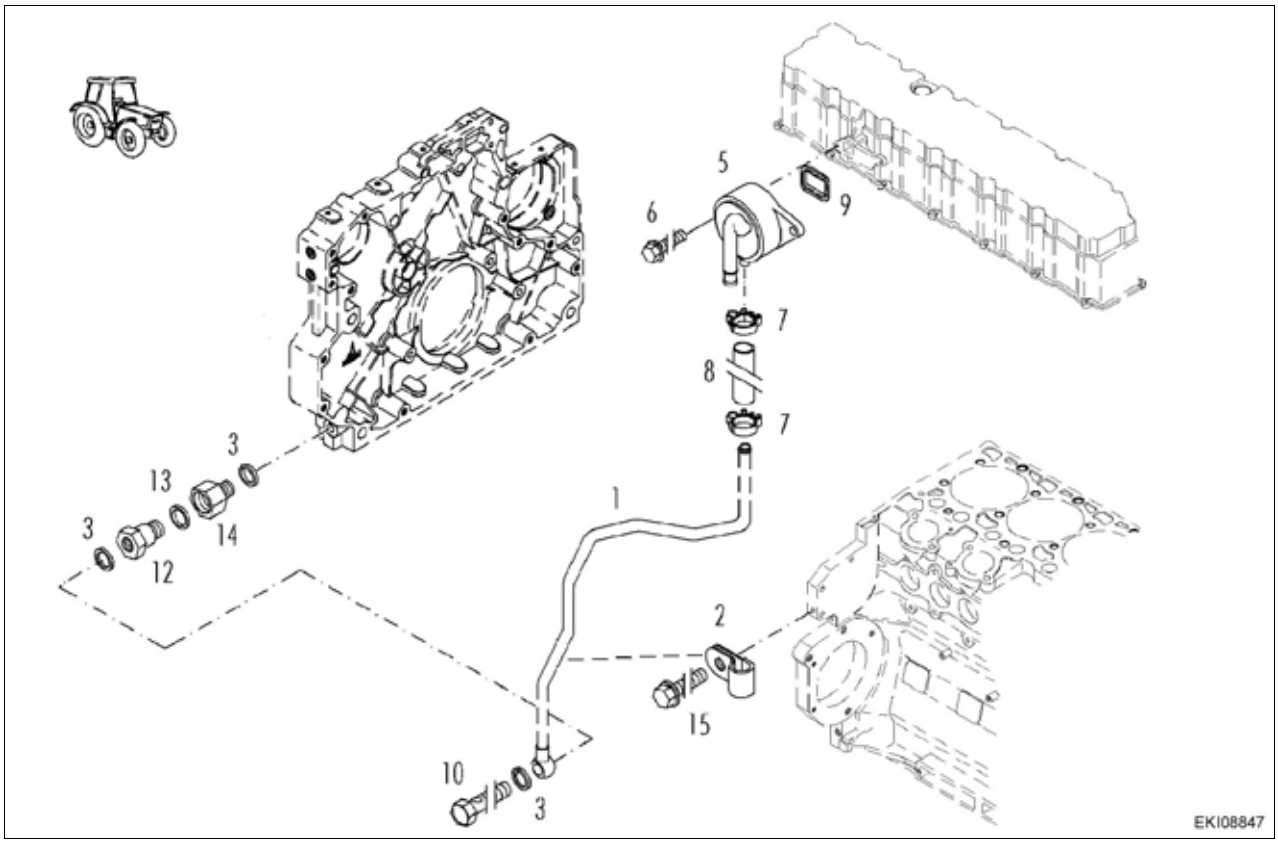


Fig. 1. I003137

Item	Designation	Item	Designation
1	Return line	9	Gasket
2	Pipe clamp	10	Banjo bolt
3	Seal ring	12	Lock valve
5	Crankcase air bleed	13	Seal ring
6	Hex screw	14	Adapter
7	Hose clamp	15	Hex screw
8	Rubber hose		

Loosen hoses and remove crankcase air bleed

Fig. 2. I002482

Carefully unlock and open cover

Fig. 3. I003133

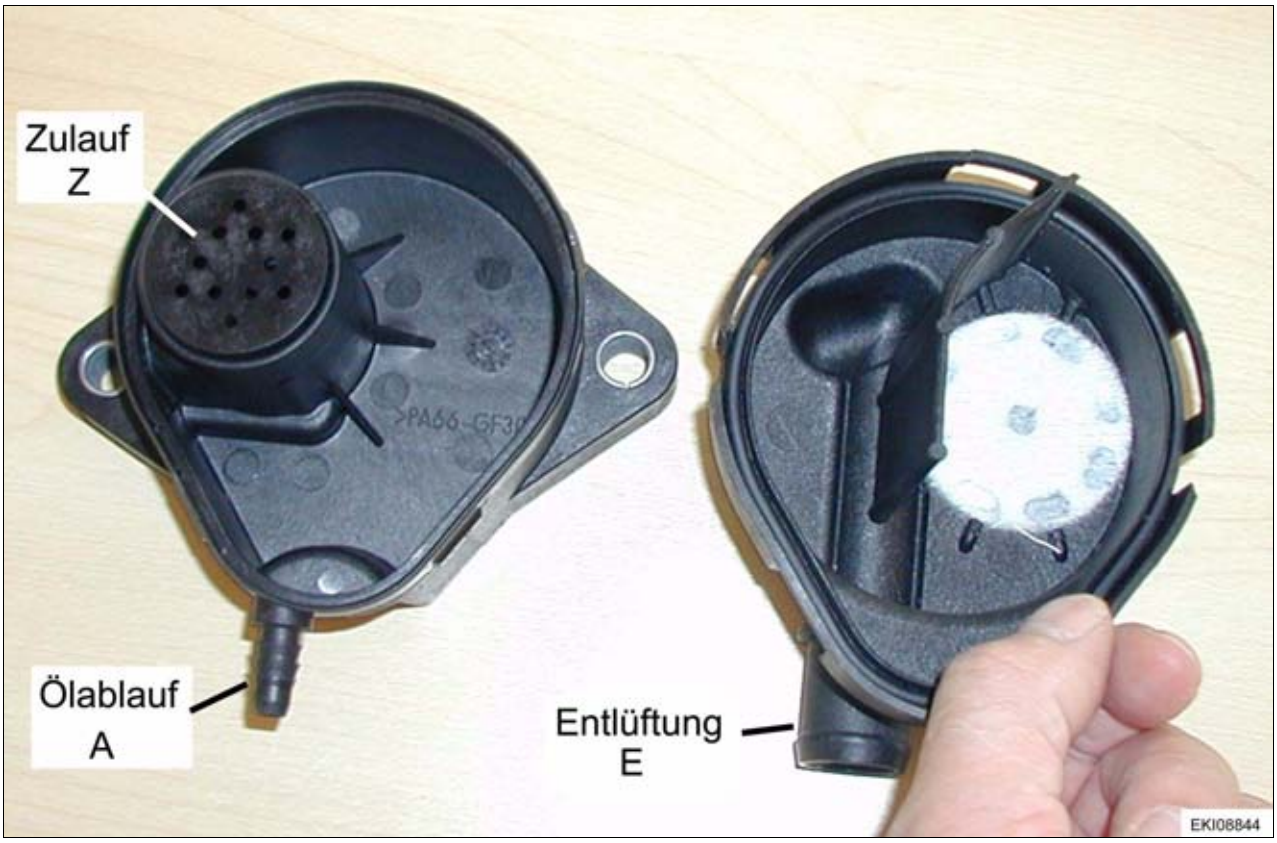


Fig. 4. I003134

Item	Designation	Item	Designation
Z	Feed	E	Air bleed (to the atmosphere)
A	Engine oil drain to the crankcase		

Lightly oil the O-ring and insert it in the groove

Fig. 5. I003135

Lock the cover

Fig. 6. I003133

Lightly oil the seal and insert it in the groove

Fig. 7. I003136

Install crankcase air bleed, attach hoses

Fig. 8. I002482

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

2312

Engine/lubrication

2312 Engine/lubrication

A General. 5

A General

1 Diagram: engine lubrication 7

1 Diagram: engine lubrication

Engine lubrication diagram

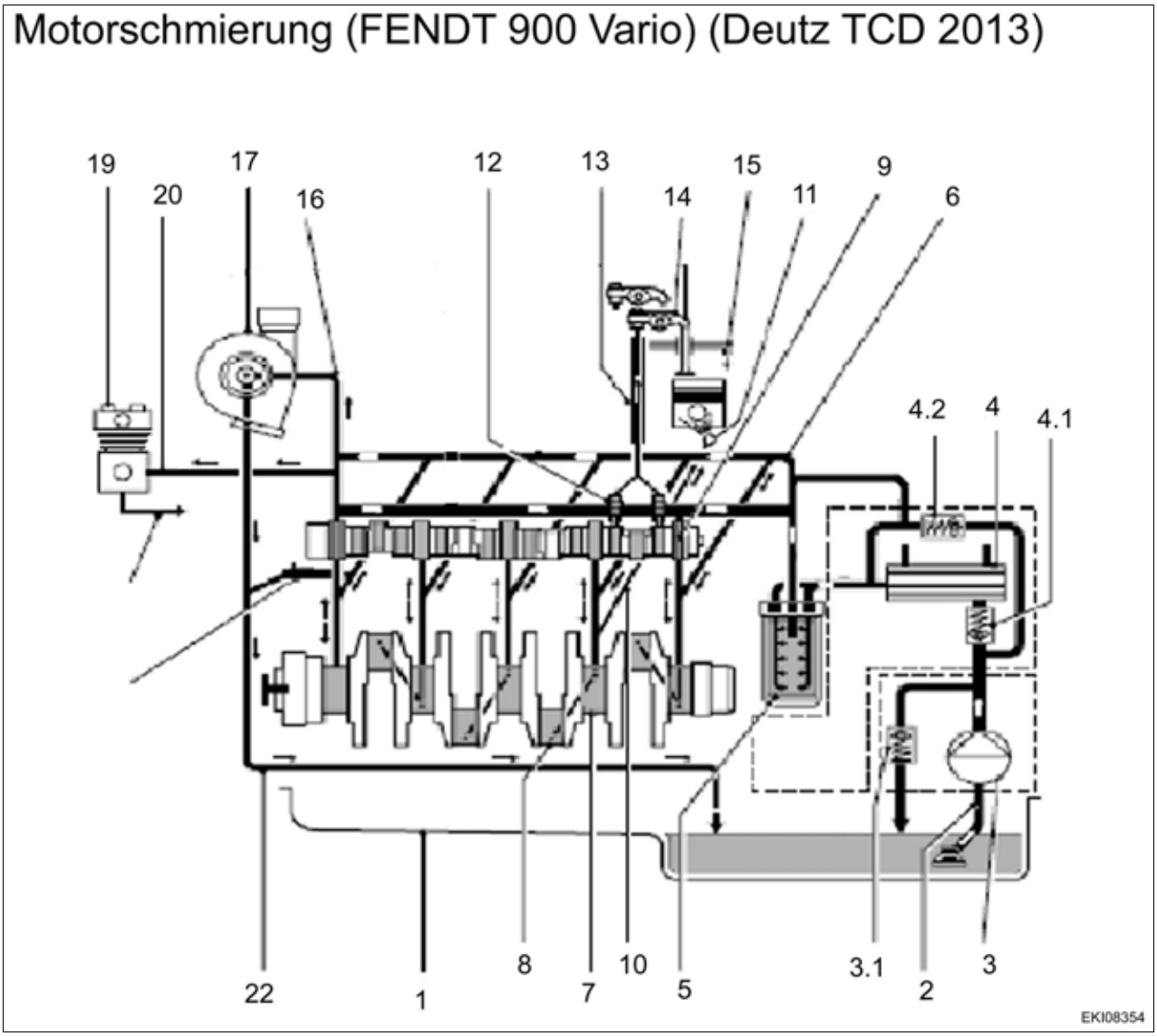


Fig. 1. I001608

Item	Designation	Item	Designation
1	Oil sump	12	Plunger
2	Intake duct	13	Push rod (oil feed for the rocker arm)
3	Lubrication pump	14	Rocker arm
	3.1 DBV lubricating oil	15	Return line to the oil sump
4	Lubrication oil cooler	16	Oil line to the exhaust turbocharger
	4.1 Lock valve	17	Exhaust turbocharger
	4.2 Lubrication oil cooler bypass	18	Return line from the air compressor / hydraulic pump
5	Replaceable filter	19	Air compressor / hydraulic pump
6	Main oil pipe	20	Oil line to the air compressor / hydraulic pump drive
7	Crankshaft bearing	21	Return line from the cylinder head
8	Connecting rod bearing	22	Return line from the exhaust turbocharger

Item	Designation	Item	Designation
9	Camshaft bearing		
10	Oil duct for cooling the piston head		
11	Injection nozzle for cooling the piston head		

Oil filter console

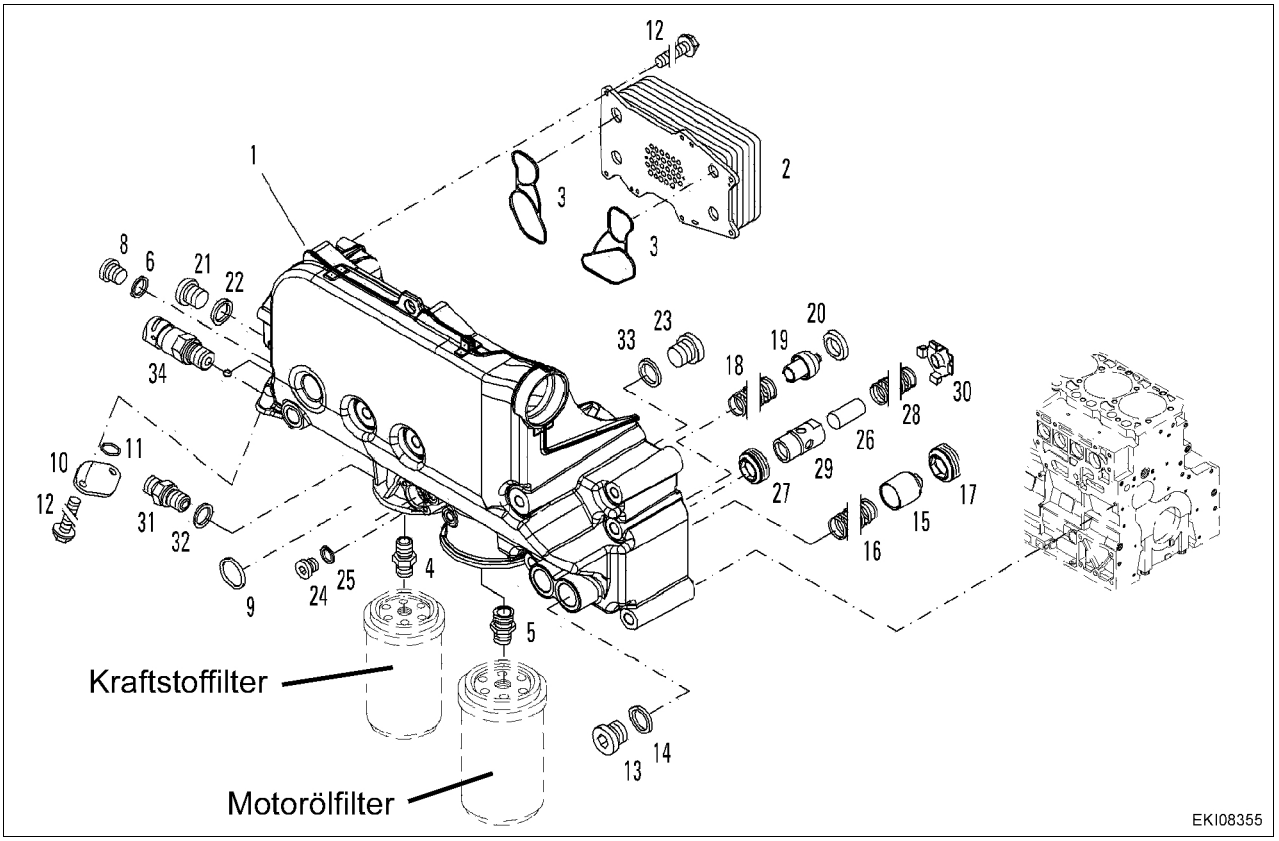


Fig. 2. I002047

Item	Designation	Item	Designation
1	Oil filter console	19	Cone (lubrication oil cooler bypass)
2	Engine oil cooler	20	Valve seat
3	Gasket	21	Screw plug
4	Threaded bush	22	Seal ring
5	Screw socket	23	Screw plug
6	Seal ring	24	Screw plug
8	Screw plug	25	Seal ring
9	O-ring seal	26	Valve piston (shutoff valve)
10	Blind flange: (engine preheater, cooling water)	27	Retaining screw
11	O-ring seal	28	Spring
12	Hex screw	29	Bushing
13	Screw plug	30	Securing plate
14	Seal ring	31	Coupling
15	Valve piston (lock valve)	32	Seal ring
16	Spring	33	Seal ring
17	Valve seat	34	B087 fuel low pressure sensor
18	Spring	34	B090 engine oil pressure sensor

Oil intake and lubrication pump

TCD 2013 series engines have forced feed lubrication.
The lubrication oil flows from the lubrication pump to the oil filter through the oil cooler.
Both components are attached to the oil filter console.
The oil filter console is flange-mounted on the crankcase.
The lubrication pump is mounted in the crankcase end cover.

Oil intake with intake filter

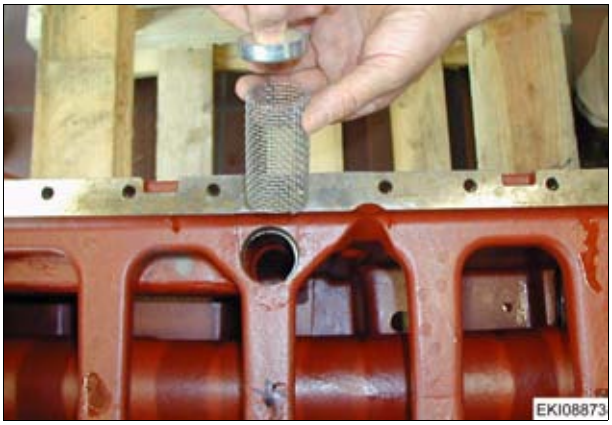


Fig. 3. I003271

Lubrication pump oil intake (arrowed)

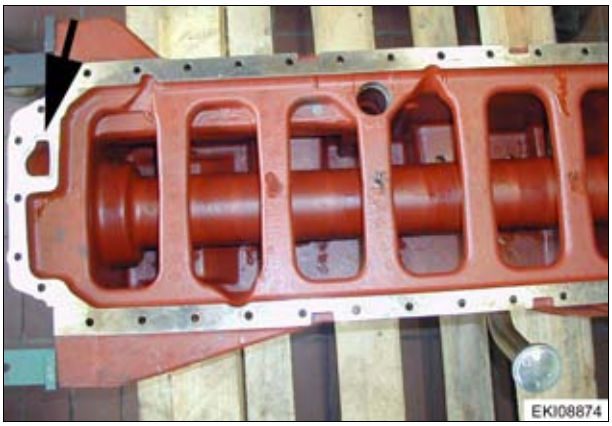


Fig. 4. I003272

Lubrication pump drive gear (arrowed)
Lubrication pump intake (arrowed)

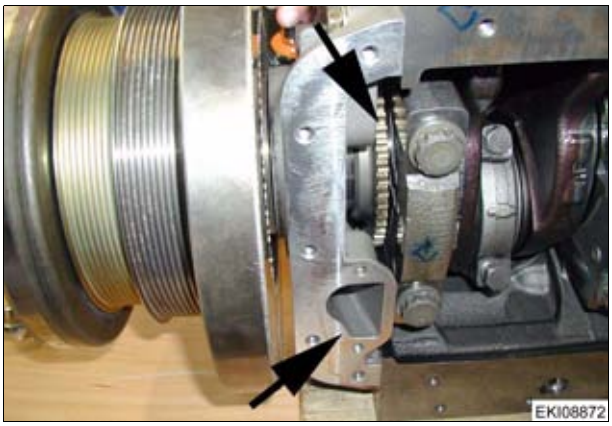


Fig. 5. I003273

Crankcase end cover with the lubrication pump

Fig. 6. I003274

Crankcase end cover with the lubrication pump

Fig. 7. I003275

Lubrication pump (rotor pump)

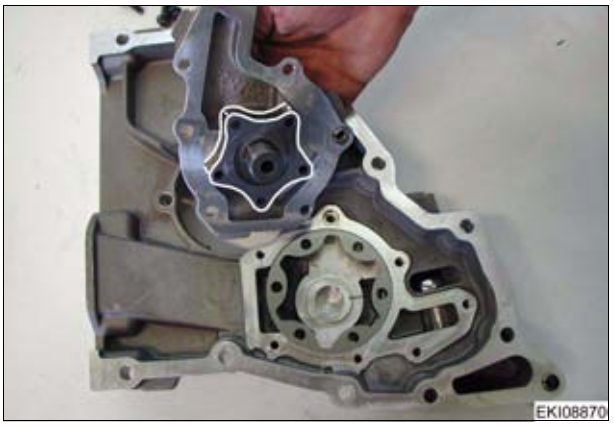


Fig. 8. I003276

Function diagram of the lubrication pump (rotor pump)

1	Internal pipe
2	Pressure chamber for crankcase
3	Suction chamber
4	Carrier

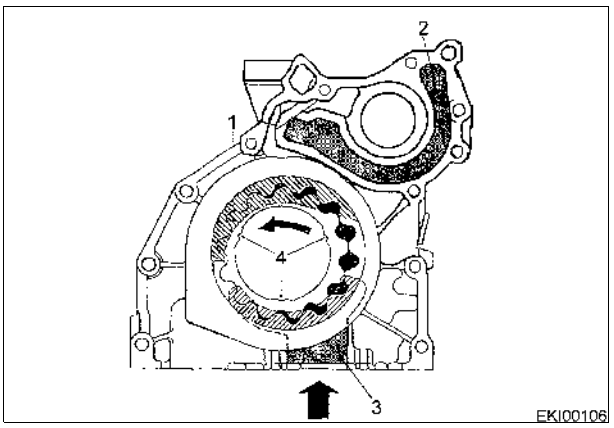


Fig. 9. I001613

DBV lubricating oil

NOTE: *See also:*
Chapter 9000 Reg.E - Measuring and testing the B090 engine oil pressure sensor

Fig. 10. I003277

B090 engine oil pressure sensor
X1659 separation point on B090 sensor

B087 fuel low pressure sensor

On oil filter housing.

NOTE: *For measuring and testing engine oil pressure, see chapter 9000 Reg.E – Measuring and testing B090 engine oil pressure sensor.*

Fig. 11. I001087

Piston base cooling

Nozzle for piston base cooling

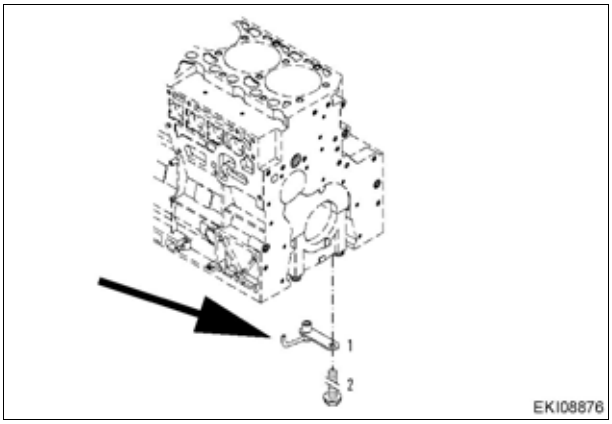


Fig. 12. I003279

Piston with cast ring channel for piston base cooling

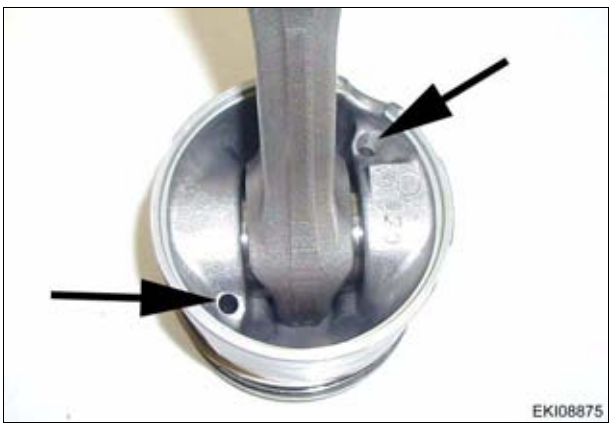


Fig. 13. I003278

A	General
B	Faults
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D	Component location
E	Testing
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G	Repair
H	Service – Info

2400

Engine/exhaust system

2400 Engine/exhaust system

A General. 5

A General

1 Y094 actuator unit, AGR (exhaust gas recirculation) 7

1 Y094 actuator unit, AGR (exhaust gas recirculation)

Diagram: exhaust gas recirculation (AGR)

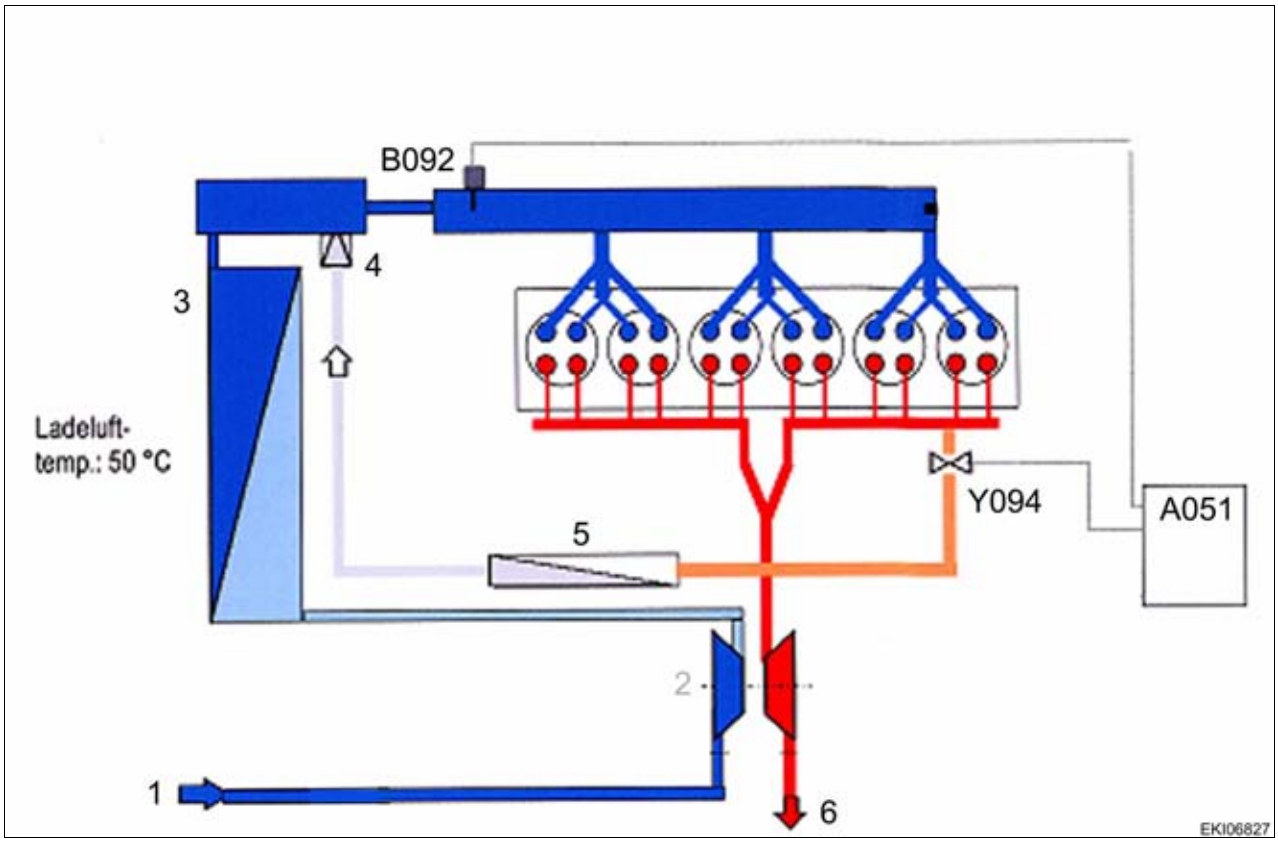


Fig. 1. I006293

Item	Designation	Item	Designation
1	Inlet air	6	Exhaust gases
2	Exhaust turbocharger		
3	Intercooler	**A051** - ECU, engine control unit (EDC 7).	
4	Non-return valve (flutter valve)	**B092** - Sensor, charge air pressure/temperature	
5	Exhaust gas cooler	**Y094** - Actuator unit, AGR (exhaust gas recirculation)	

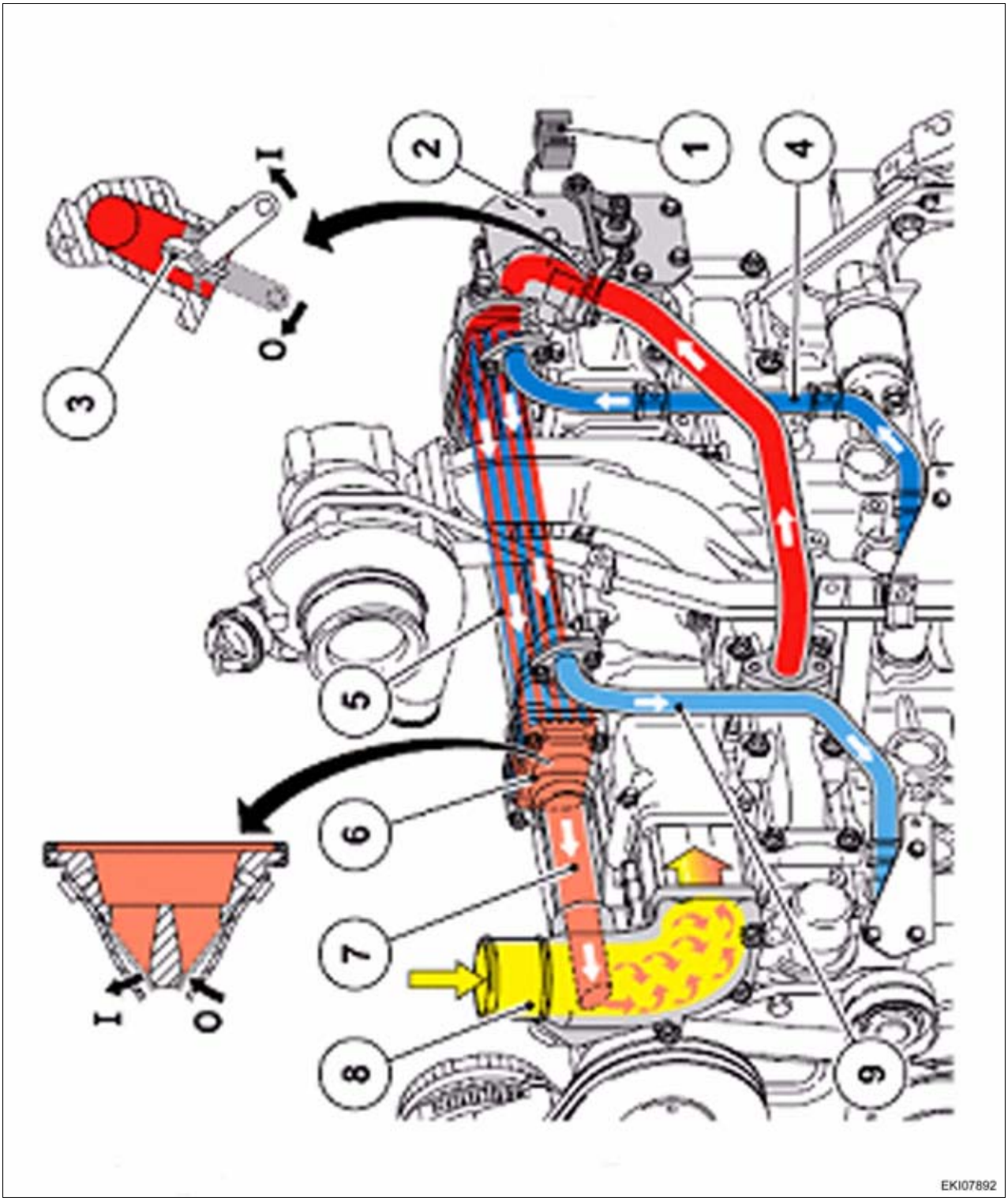


Fig. 2. I001841

Item	Designation	Item	Designation
1	X1674 separation point	5	Exhaust gas cooler
2	Y094 exhaust gas recirculation actuator motor	6	Non-return valve (flutter valve)
3	Exhaust-gas flap	7	Exhaust gas recirculation
4	Water cooler feed	8	Intake manifold

Reason for exhaust gas recirculation

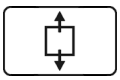
Due to exhaust gas recirculation into the combustion chamber (cylinder), the burning speed of the diesel-air mixture decreases, thus lowering the maximum combustion temperature.

Due to the drop in combustion temperature, the nitrogen oxide ratio in the exhaust decreases.
The **A051** - ECU, engine control unit (EDC 7). controls the exhaust gas recirculation into the combustion chamber depending on the engine load and speed.
The maximum exhaust gas recirculation rate is approx. 10%.

Functional description: **Y094** - Actuator unit, AGR (exhaust gas recirculation)

A **Exhaust flap open**
Z **Exhaust flap closed**

On left side of engine



Remove cover panel.

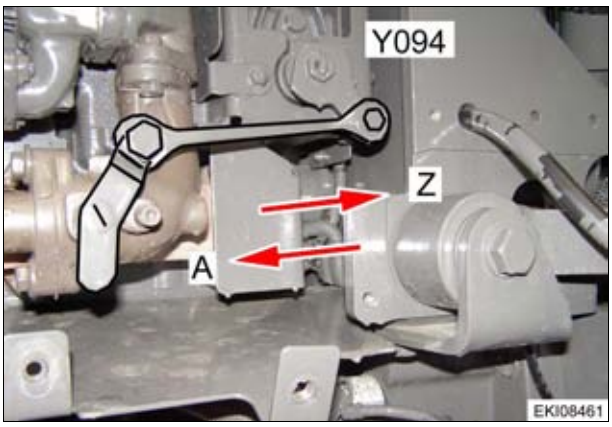


Fig. 3. ***Y094*** *- Actuator unit, AGR (exhaust gas recirculation)* I001846

After ignition ON, the **Y094** - Actuator unit, AGR (exhaust gas recirculation) moves to the exhaust flap stops, calibration. 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!)

NOTE: *see §157*

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

2712

Engine/injectors

2712 Engine/injectors

E Measuring and testing 5

E Measuring and testing

1 Switching off the injector valve (injector) 7

1 Switching off the injector valve (injector)

It is possible to switch the cylinders off individually with the aid of adapter cable X899.980.259.101 (short-circuiting)

NOTE: *Engine without load*
Y095 injector 1
(on flywheel side)

Fig. 1. I004022

Cylinder switch-off
Switch off ignition.
Connect adapter cable X899.980.259.101
Start engine.
Switch off injectors one after the other and observe engine running characteristics, connect corresponding pins to each other (see table below)
If the engine running characteristics do not change when a cylinder is switched off, the injector in question is faulty.

Use adapter cable X899.980.259.101 to connect pins at separation point X1673 / X1677 as indicated in the table

is switched off:	Pin (at X1673)	Connect to Pin	Fault code
Y095 injector 1	2	4	1E.1.7C
Y096 injector 2	2	5	1E.1.7D
Y097 injector 3	2	7	1E.1.7E

is switched off:	Pin (at X1677)	Connect to Pin	Fault code
Y098 injector 4	2	4	1E.1.7F
Y100 injector 5	2	5	1E.1.80
Y101 injector 6	2	7	1E.1.81

A	General
B	Faults
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E	Testing
F	Setting and Calibration
G	Repair
H	Service – Info

3000

Overall system/front axle

3000 Overall system/front axle

A General. 5

G Repair. 21

A General

1 Front axle overview 7
2 Functional description: front axle suspension 9
3 Front axle suspension operation and function 11
4 Functional plans 12

1 Front axle overview

Front axle overview			
Vehicle type	**Chassis number**	**FENDT spare part number**	**Front axle type**
309 Vario COM III	336 / .. / 0101 onwards	E 339.300.020.021	Company: CARRARO Type: 20.19
310 Vario COM III	337 / .. / 0101 onwards		
311 Vario COM III	338 / .. / 0101 onwards		
312 Vario COM III	339 / .. / 0101 onwards		
411 Vario COM III	400 / .. / 0101 onwards	E 402.300.020.010	Company: DANA Type: 730/124
412 Vario COM III	401 / .. / 0101 onwards		
413 Vario COM III	402 / .. / 0101 onwards		
414 Vario COM III	403 / .. / 0101 onwards	E 404.300.020.010	Company: DANA Type: 740/152
415 Vario COM III	404 / .. / 0101 onwards		
712 Vario COM III	724 / .. / 0101 onwards	E 718.301.021.021	Company: DANA Type: 745/143
714 Vario COM III	725 / .. / 0101 onwards		
716 Vario COM III	726 / .. / 0101 onwards		
718 Vario COM III	727 / .. / 0101 onwards		
818 Vario COM III	729 / .. / 0101 onwards	E 718.301.021.021	Company: DANA Type: 745/143
820 Vario COM III	731 / .. / 0101 onwards		
820 Vario COM III "Greentec"	731 / 27 / 0101 onwards		
922 Vario COM III "Power" (1-circuit brake)	919/21/from 0101	E 931.304.000.030	Company: DANA Type: 970/130 (40/50) km/h
924 Vario COM III "Power" (1-circuit brake)	922/21/from 0101		
927 Vario COM III "Power" (1-circuit brake)	925/21/from 0101		
930 Vario COM III "Power" (1-circuit brake)	928/21/from 0101		
933 Vario COM III "Power" (1-circuit brake)	931/21/from 0101		
936 Vario COM III "Power" (1-circuit brake)	934/21/from 0101		

Front axle overview			
Vehicle type	**Chassis number**	**FENDT spare part number**	**Front axle type**
922 Vario COM III "Profi" (1-circuit brake)	919/23/from 0101	E 931.303.000.030	Company: DANA Type: 970/140 (40/50/60) km/h
924 Vario COM III "Profi" (2-circuit brake)	924/23/from 0101		
927 Vario COM III "Profi" (2-circuit brake)	927/23/from 0101		
930 Vario COM III "Profi" (2-circuit brake)	930/23/from 0101		
933 Vario COM III "Profi" (2-circuit brake)	933/23/from 0101		
936 Vario COM III "Profi" (2-circuit brake)	936/23/from 0101		

2 Functional description: front axle suspension

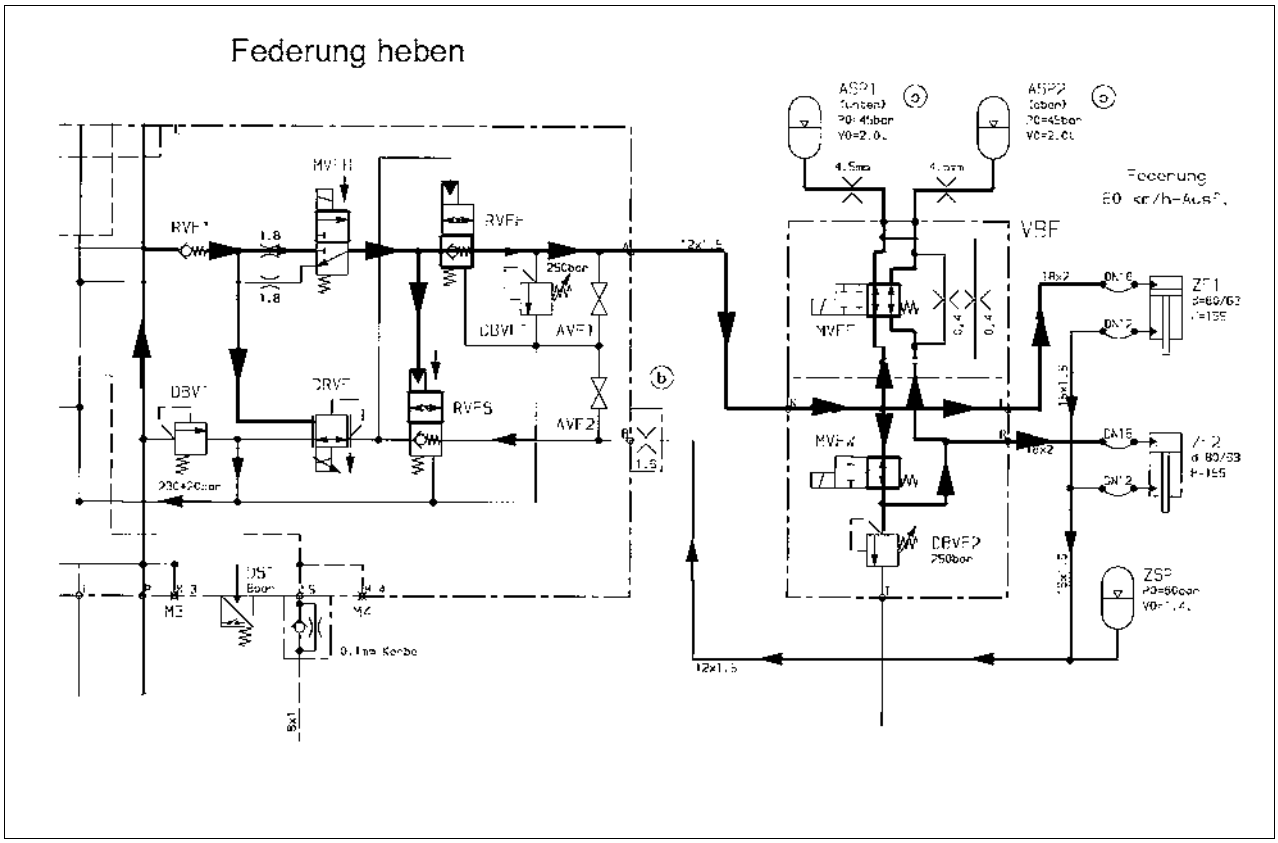

Fig. 1. I001321

Raise suspension

If the raise suspension button in the multifunction armrest is depressed for approx. 5 seconds, the solenoid valve (MVFH) is energised and the oil flows to the piston side of the suspension cylinders via the raise suspension non-return valve (RVFH). From the non-return valve, the oil flows straight to suspension cylinder 1 (ZF1) and via the suspension wobble stabiliser solenoid valve (MVFW) to suspension cylinder 2 (ZF2). The pressure generated in the line upstream of the raise suspension non-return valve (RVFH) causes the lower non-return valve (RVFS) to be deflected and releases the line from the piston rod side of the suspension cylinder to the tank via the pressure cut-off valve (DRVF). The pressure control valve (FRVF) is energised until a counter pressure of 100 bar is generated. The raising operation continues as long as the button is pressed.

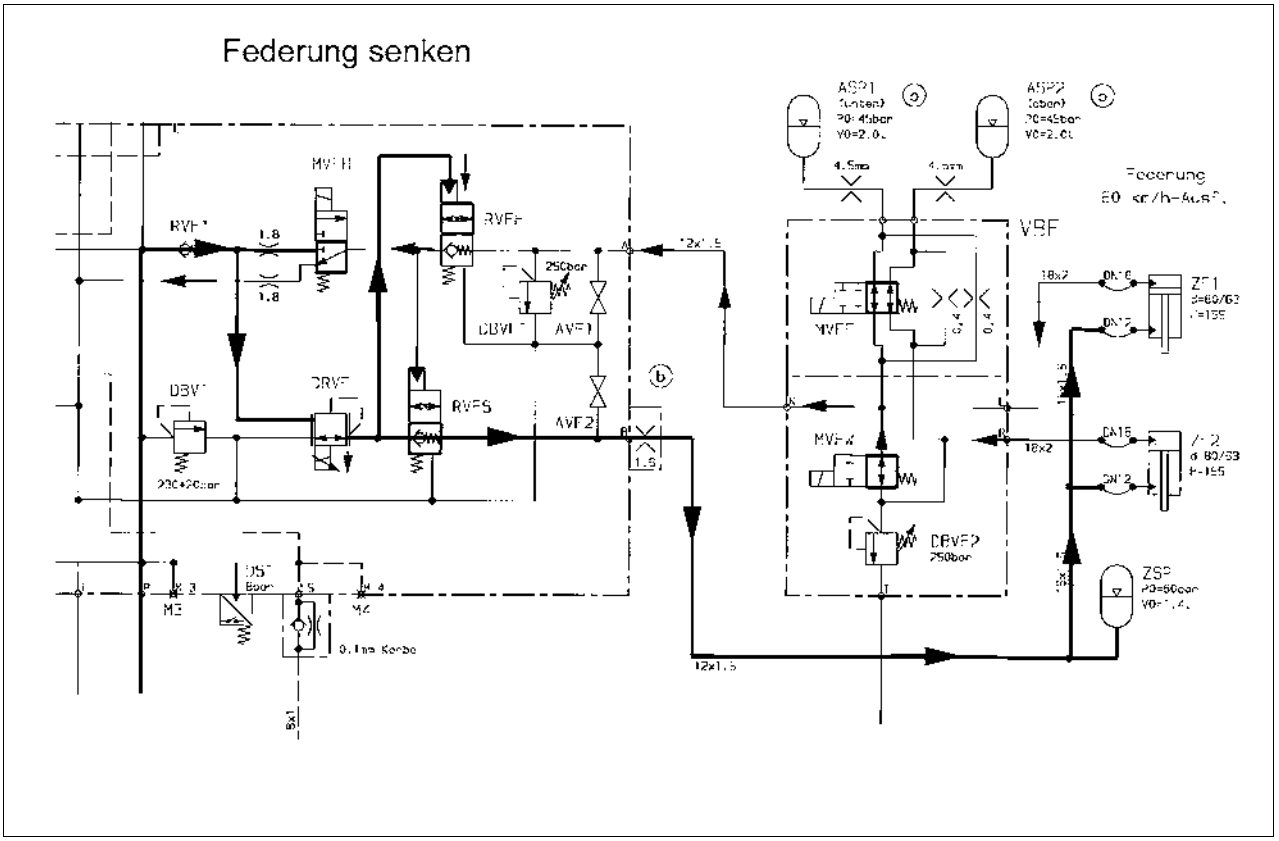

Fig. 2. I001322

Lower suspension

If the lower suspension button in the multifunction armrest is depressed for approx. 5 seconds, the pressure cut-off valve (DRVF) is energised and the oil flows through the lower suspension non-return valve (RVFS) at a pressure of 100 bar to the piston rod side of the suspension cylinder. The pressure generated in the line upstream of the lower suspension non-return valve (RVFS) hydraulically deflects the raise suspension non-return valve (RVFH) and releases the line from the piston side to the tank. The lowering operation continues for as long as the button is depressed.

Wobble stabiliser

Tractors with a 2-circuit brake system have a wobble stabiliser solenoid valve (MVFW) installed as standard (optional for 1-circuit brake systems). The solenoid valve is energised from a speed of 25 km/h and switches to locked mode. This severs the link between the piston ends of the two suspension cylinders and no further oil is exchanged. The lock prevents the tractor from "wobbling". Below a speed of 15 km/h, the solenoid valve is de-energised and switched to flow mode.

Lock suspension

If the lower suspension button in the multifunction armrest is briefly depressed, the lock suspension solenoid valve (MVFF) is energised and switches to locked mode. This severs the connection between the piston ends of the two suspension accumulators (ASP1 +ASP2) and the suspension cylinder, causing the suspension to become "hard", i.e. no longer dampened. The suspension can only be locked at speeds below 15 km/h. At higher speeds, the valve switches back to flow and the suspension is reactivated.

3 Front axle suspension operation and function

Front axle suspension

A Lock/lower suspension
B Lower/raise suspension

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

NOTE: *Functions can only be selected while the engine is running.*

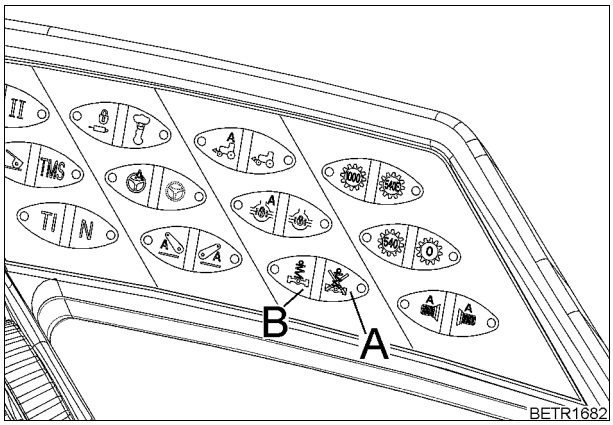

Fig. 3. I000974

Front axle suspension functions

- **Locked mode** (front axle suspension with harder suspension and levelling)
- **Suspension mode** (with level levelling)
- **Lower front axle suspension**
- **Raising front axle suspension**

NOTE: *When the tractor is started, the function last selected is activated.*

Locked mode (front axle suspension with harder suspension)

The front axle is in central position
Briefly press "Lock suspension" button (A) for less than 3 seconds.
The LED next to the button lights up.

NOTE: *Locked mode automatically deactivates at speeds over 15 km/h.*
The LED goes out.

Suspension mode

Briefly press "Suspension ON" button (B) for less than 3 seconds.
The LED next to the button lights up.
The front axle is in central position

NOTE: *With the 2-circuit brake system, the wobble stabiliser (FSC) automatically engages over 40 km/h and automatically disengages at below 15 km/h.*
FSC = Fendt Stability Control

Lower front axle suspension

Press "Lock suspension" button (A) for more than 3 seconds.
The tractor frame is lowered to the stop at the front axle.
The LED next to the button lights up.
The tractor frame will not automatically adjust to the central position of the suspension range until its speed exceeds 2 km/h.

Raising front axle suspension

When the tractor is stationary:
Press and hold "Suspension ON" button (B) for more than 3 seconds.
As long as button (B) remains pressed, the tractor frame will raise over the entire suspension range.
Only once speed exceeds 2 km/h will the tractor frame automatically adjust to the central position of the suspension range.
The LED next to the button lights up.

Levelling

Levelling is temporarily deactivated:

- during braking
- below speeds of 2 km/h
- if the front axle load is too high

4 Functional plans

Operating status: tractor suspended
Function:

- Suspension = oil exchange between cylinder and nitrogen diaphragm accumulator
- Peak pressures are limited to 250 bar with the stock valve DBVF1
- A050 - ECU, basic control unit continuously determines the mean value of all movements (B066 left wheel position sensor and B068 right wheel position sensor)
- Any deviations from the level-controlled centre position trigger the adjustment
  NOTE: *The front axle is only re-adjusted for speeds faster than 2 km/h.*
  From software version (EOL) 7.63 04/09, re-adjustment occurs at 0,5 km/h if the rear PTO is running.

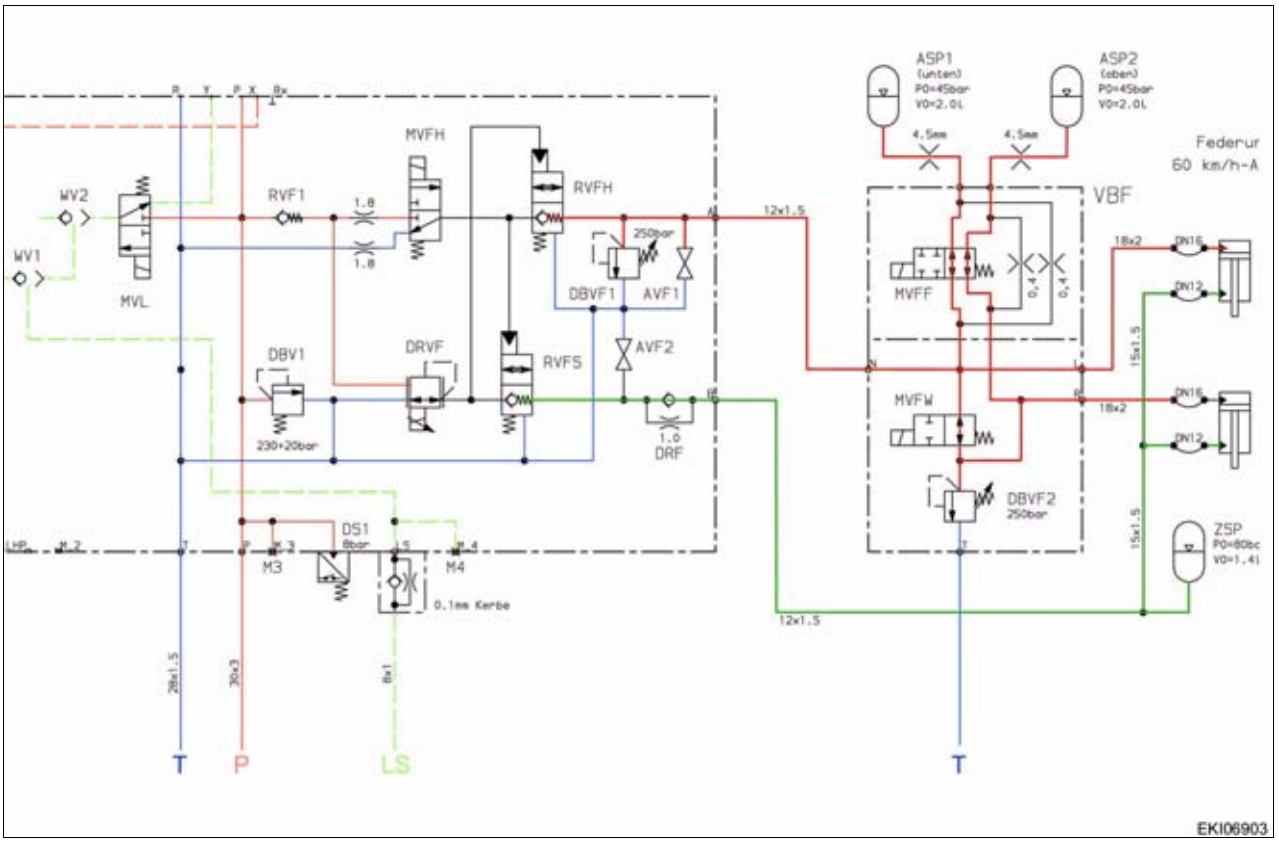

Fig. 4. I007357

Operating status: "raise"

Function:

– MVL charge solenoid valve activates the LS pump (PR)

– MVFH solenoid valve, raise suspension, is energised, causing the RVFS lower suspension non-return valve to be opened and oil to be fed to the piston crown side (compression stage)

– Suspension pressure cut-off valve (DRVF) is energised with approx. half voltage, hence generating approx. 100 bar of pressure on the piston rod side (drawing stage).

– The flow through cover 1.8 mm determines the lift speed

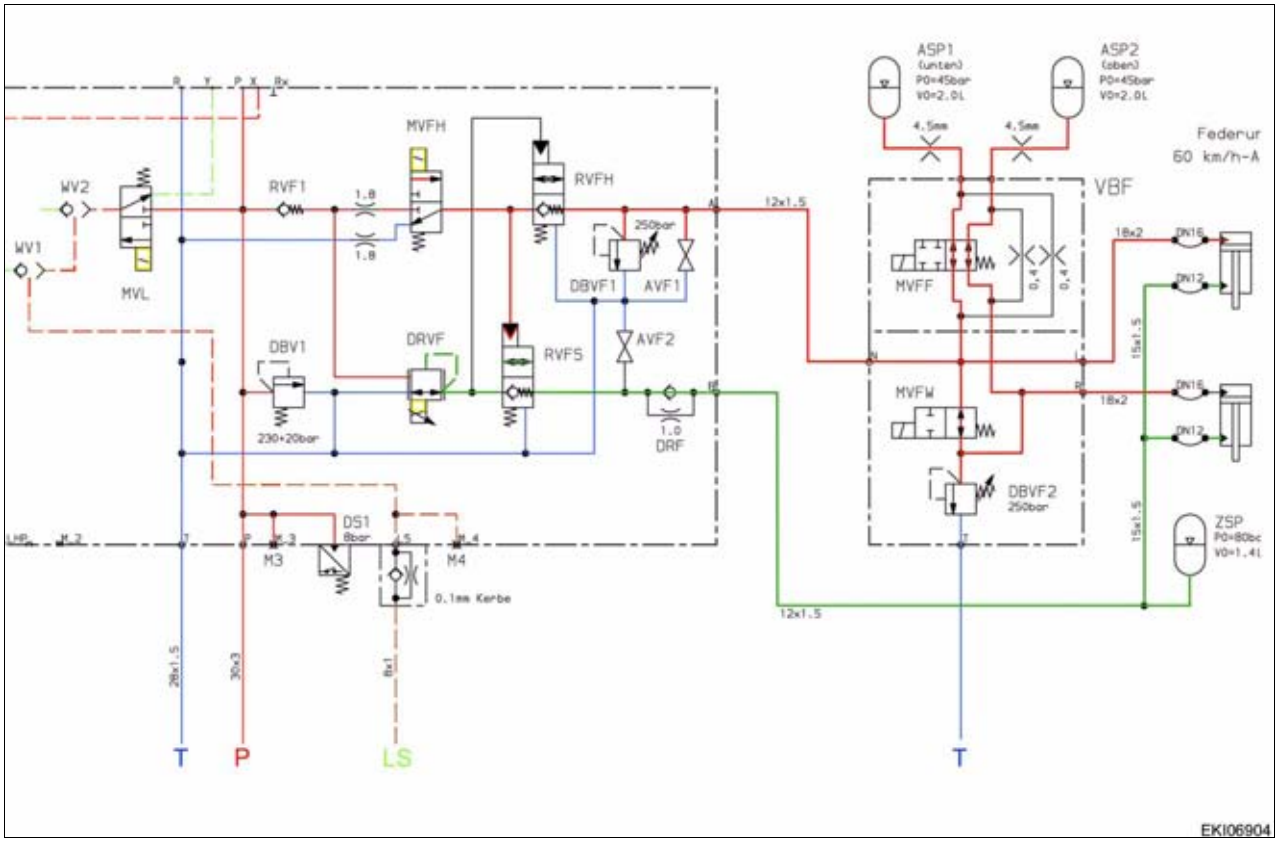

Fig. 5. I007358

Operating status: "lower"

Function:

– MVL charge solenoid valve activates the LS pump (PR)

– The suspension pressure cut-off valve is energised with approx. half voltage, causing the suspension non-return valve to be opened hydraulically and oil to be fed to the piston rod side (retraction stage) up to approx. 100 bar

– The flow through cover 1.8 mm determines the lowering speed

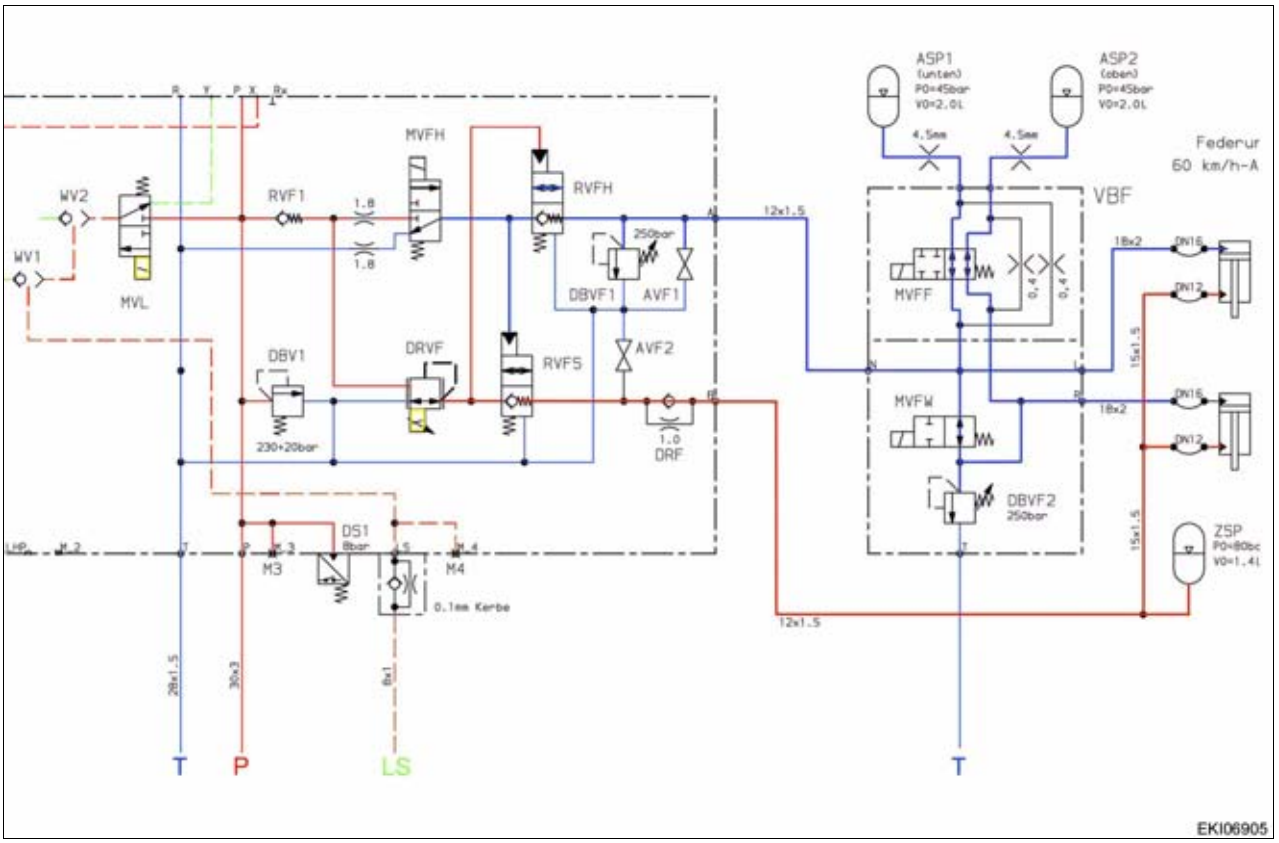

Fig. 6. I007359

Operating status: "locking the suspension"

Function:

– Lock suspension solenoid valve (MVFF) is energised; oil flow to the hydraulic accumulators is stopped

– The suspension can only be locked below 20 km/h. If the vehicle exceeds this speed, the MVFF lock suspension solenoid valve is no longer energised by the A050 ECU, basic control unit.

– If the vehicle slows to below this speed, the "locking the suspension" function is **not** reactivated automatically.

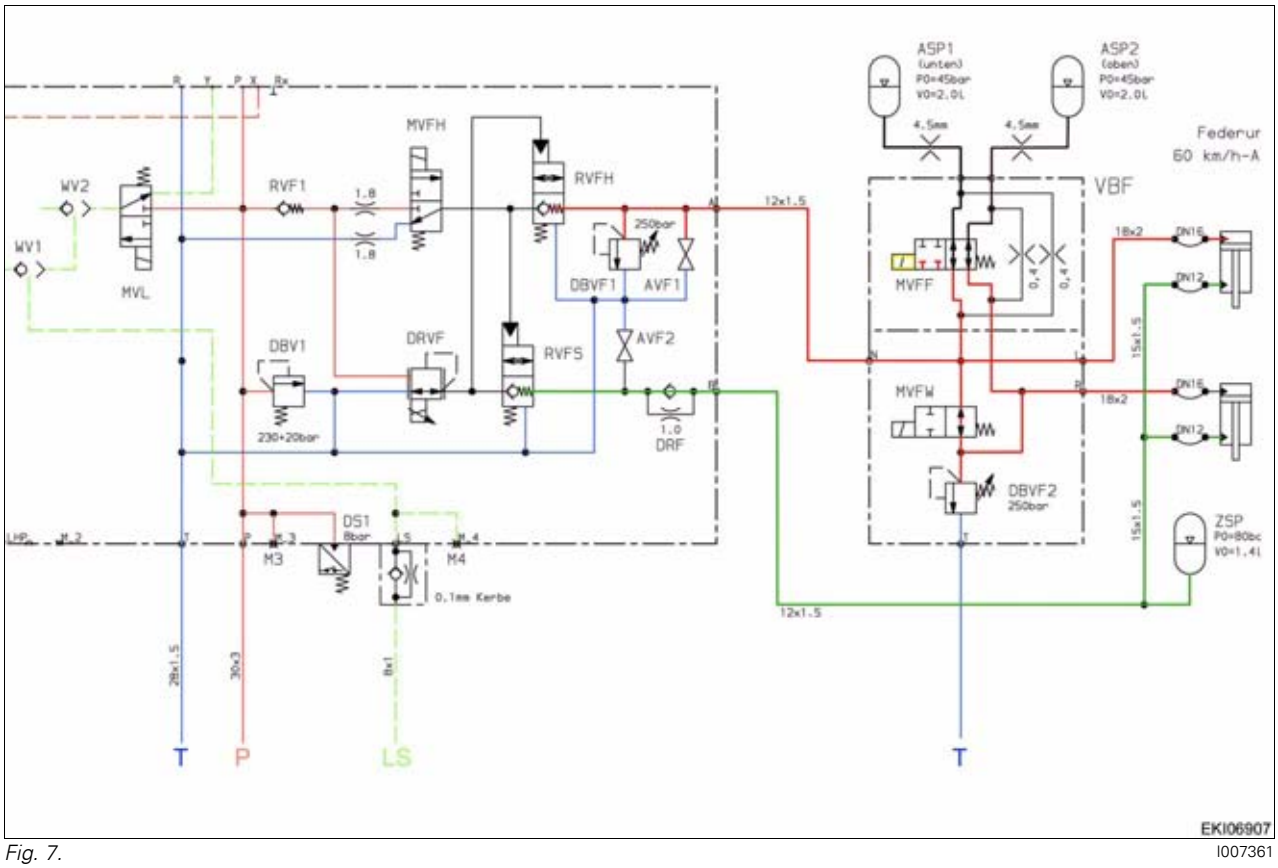

Fig. 7. I007361

"Tractors without wobble stabiliser"

– The suspension wobble stabiliser solenoid valve MVFW is not installed **as standard** in tractors with a 1-circuit brake system.

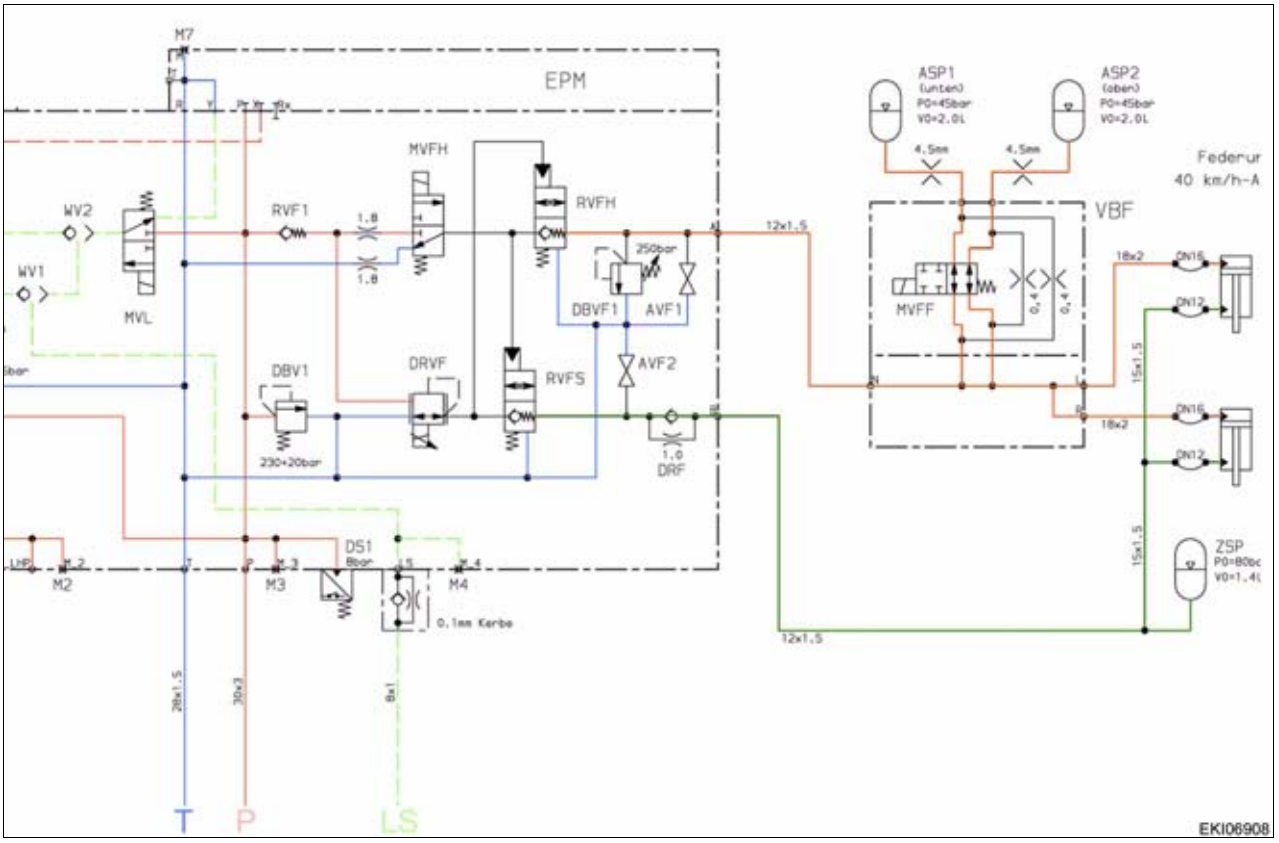

Fig. 8. I007362

NOTE: *Vehicles with chassis numbers **9XX/21/1701** and higher can be retrofitted with this equipment **upon request**.*

Operating status: "wobble stabiliser"

Function:

– MVFW suspension wobble stabiliser solenoid valve is energised when certain conditions are met:
– The tractor is driving faster than 20 km/h.
– Rotary position sensors B066, left wheel position sensor and B068 right wheel position sensor are in the same position. This means that the tractor is level, maximum permissible tolerance 25 mm.
– Energising the MVFW suspension wobble stabiliser solenoid valve causes oil to flow between right and left, the axle is prevented from swinging and, as a result, the tractor is more stable when negotiating bends.
– However, there is still some resilience in the axle: the ZF1 left suspension cylinder springs back into ASP1 suspension accumulator 1 and the ZF2 right suspension cylinder springs back into ASP2 suspension accumulator 2
– At speeds below 15 km/h with **no** brakes applied, the wobble stabiliser is switched off.
– While the wobble stabiliser is active, the front axle is **not** readjusted (raising or lowering).

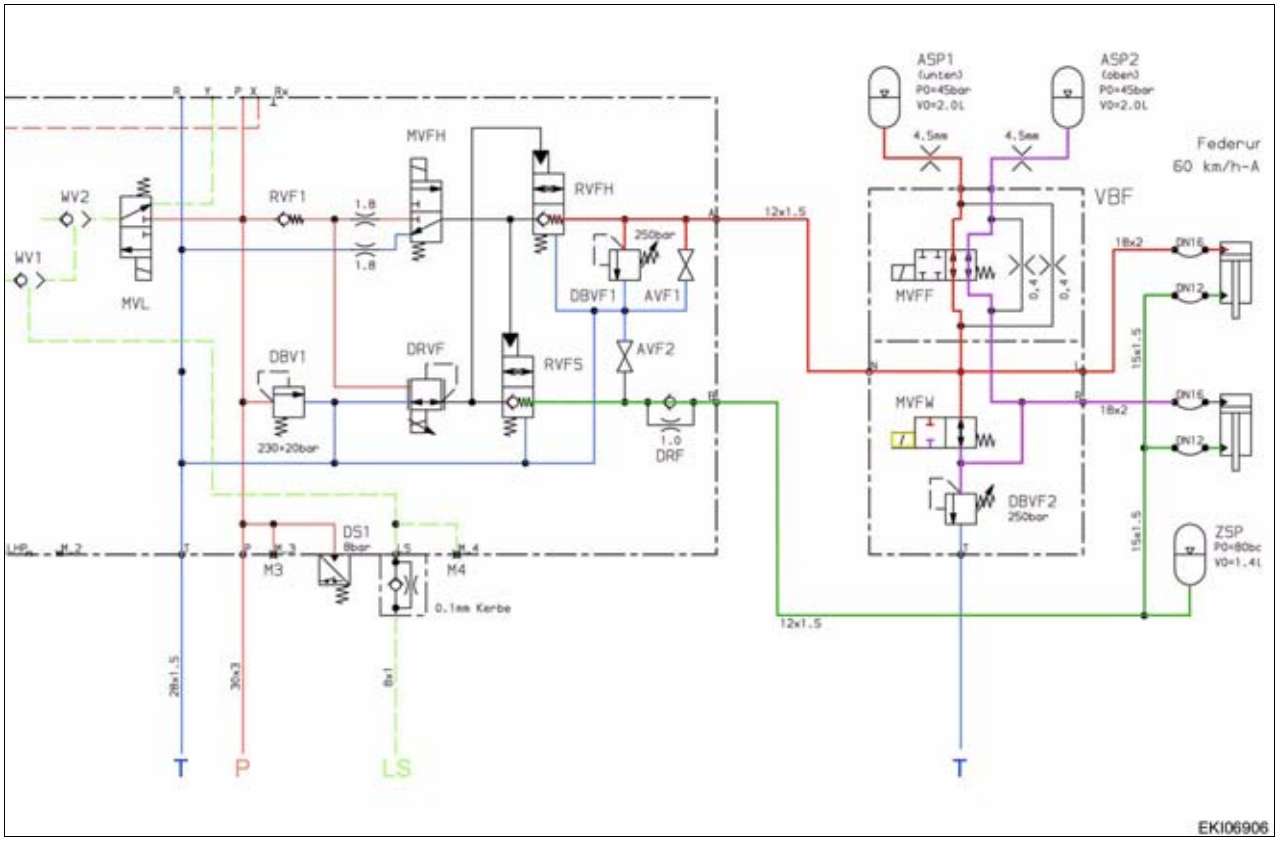

Fig. 9. I007360

Wobble stabiliser diagnostics

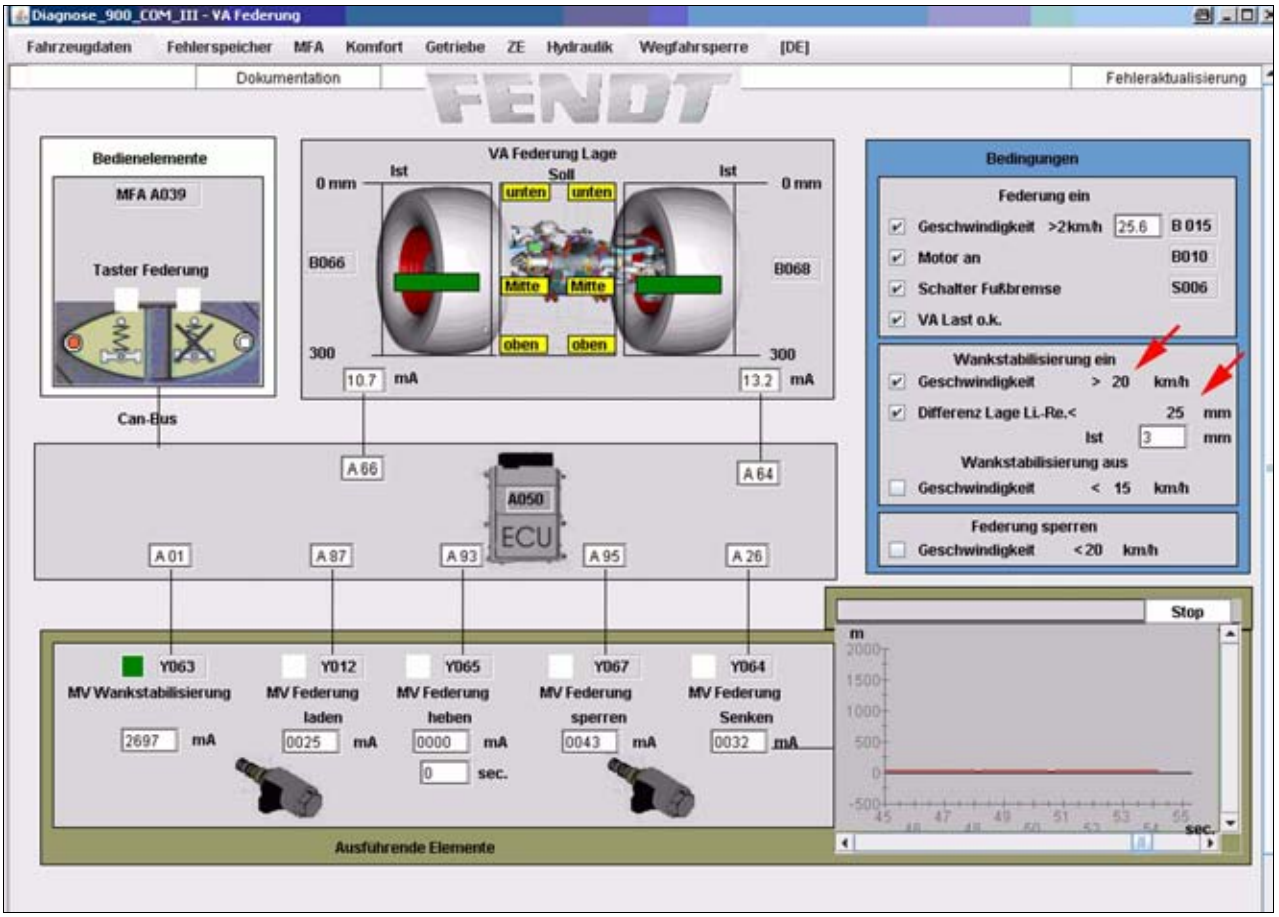

Fig. 10. I010491

The activation conditions depend on the **EOL** software version.
The best way to control the activation condition is via the Vario diagnostics (arrow).

Operating status: "suspension blocked" = "suspension OFF"

Function:

- There is always some hydraulic pressure in the suspension cylinders at the pressure stage (load) and retraction stage
- This pressure cannot be released either by pressing a button or switching off the engine
- When repair work is undertaken between the front axle suspension and the central control block, this pressure must always be released.
- **WARNING: Chassis may lower**

  This is achieved by opening the suspension 1 lock valve
- and the suspension 2 lock valve in order to release the pressure to the tank.
- See also "Safety briefing" - Chapter 0000 Reg. A

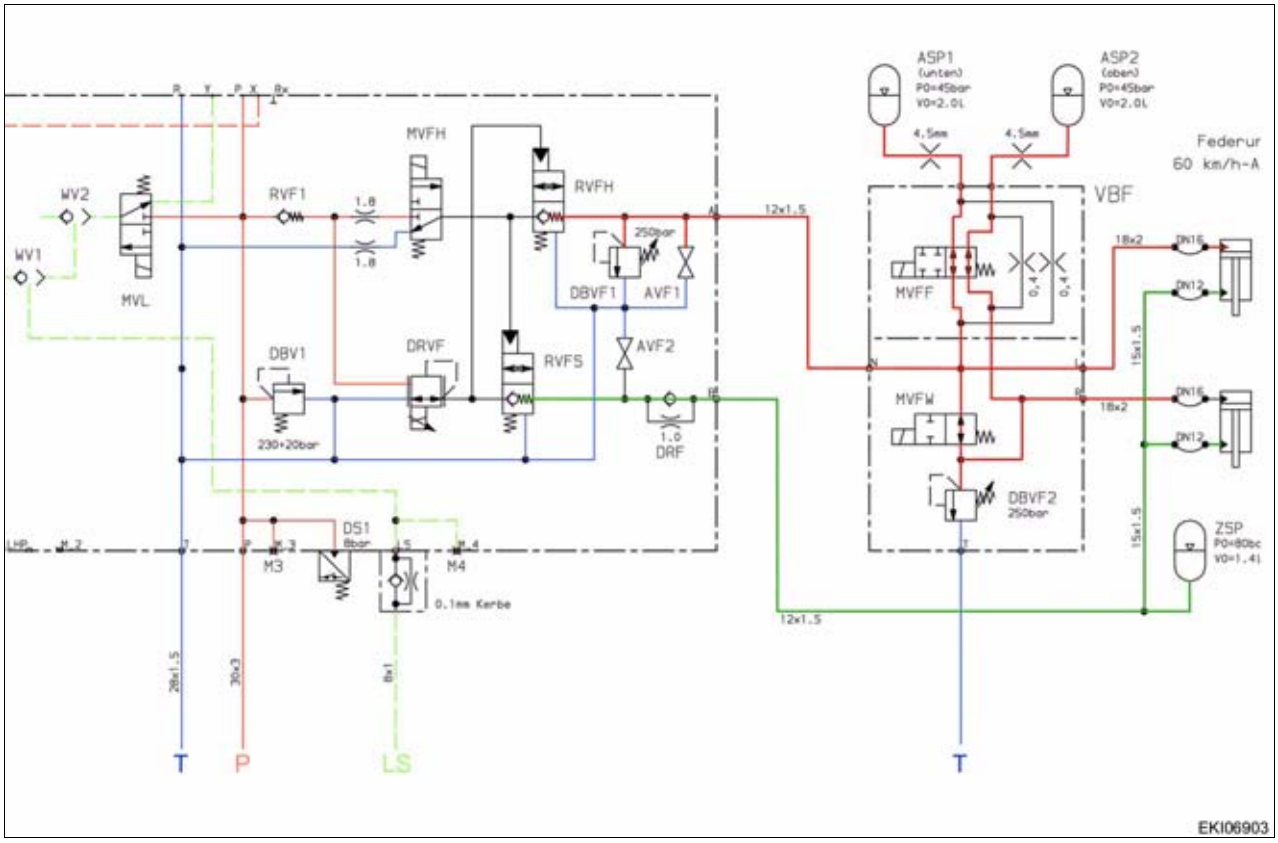

Fig. 11. I007357

G Repair

1 Removing front axle 23
2 Fitting front axle 26

1 Removing front axle

Preliminary work:

– Remove cooler assembly*see §3*

Disconnect all cable connectors in the area of the front axle and attach them to the engine

Fig. 1. I003201

Relieve pressure on the front axle suspension accumulator (open both suspension lock valves)

Fig. 2. I003206

Remove hydraulic lines (arrows) on the left side

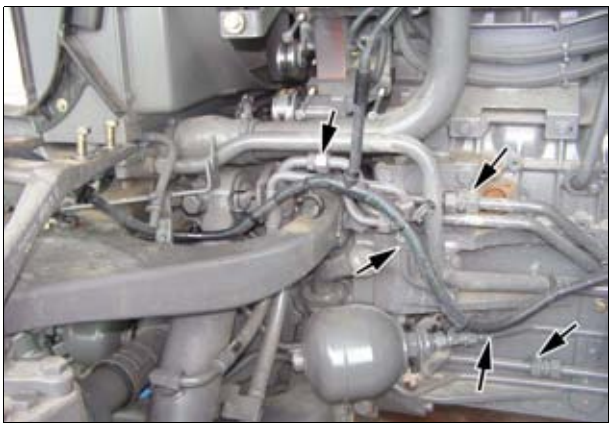

Fig. 3. I003203

Remove front axle suspension diaphragm accumulator

Fig. 4. I003207

Remove hydraulic lines (arrows) on the right side (may vary according to equipment)

Fig. 5. I003204

Remove hydraulic lines of the auxiliary control valves in the middle (arrows) (may vary according to equipment)

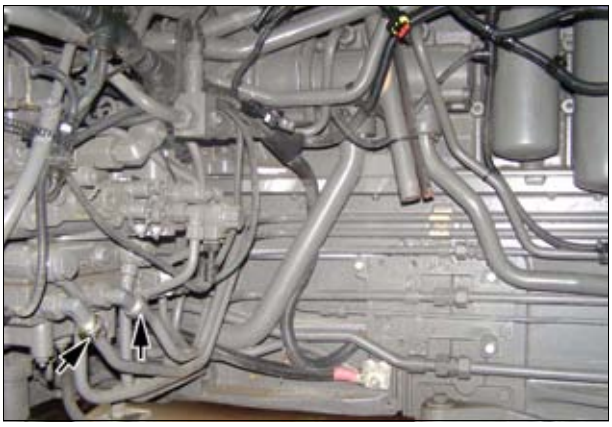

Fig. 6. I003205

Remove hydraulic lines from the front cover (may vary according to equipment)

Fig. 7. I003419

Remove filter for front axle (if present) together with hydraulic line

Fig. 8. I003208

Remove front axle suction line (if present)

Fig. 9. I003210

Place assembly trestle under engine, carefully lift the front axle and remove the connecting bolts between the engine and the front axle

Fig. 10. I003214

Remove front axle

NOTE: *Ensure there is sufficient clearance between all components.*

DANGER: Do not walk or stand under suspended loads!

Fig. 11. I004194

2 Fitting front axle

Carefully lift and fit the front axle

NOTE: *Ensure there is sufficient clearance between all components.*

DANGER: Do not walk or stand under suspended loads!

Fig. 12. I004194

Tighten flange screws
Tightening torque: 580 Nm

Fig. 13. I003221

Install the suspension diaphragm accumulator and connect hydraulic lines

Fig. 14. I003222

When replacing the front axle: Remove plug for brake line

Fig. 15. I003223

When replacing the front axle: Fit screw sockets for brake line

Fig. 16. I003224

When replacing the front axle: Install brake line from the front

Fig. 17. I003225

Connect brake line on the left and right

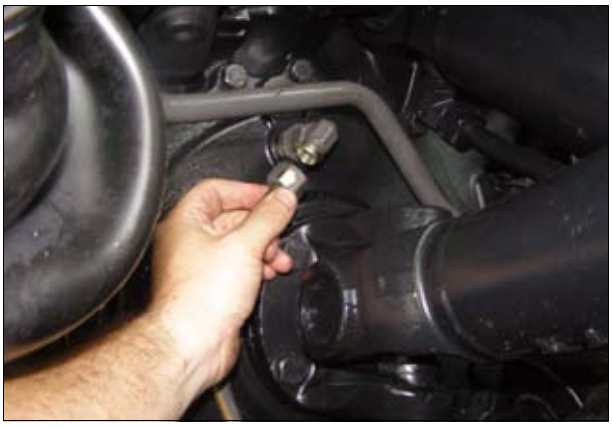

Fig. 18. I003226

Connect brake line

Fig. 19. I003249

When replacing the front axle: Fit screw sockets for steering hydraulic system

Fig. 20. I003251

Install line for the steering hydraulic system

Fig. 21. I003248

When replacing the front axle: Install diaphragm accumulator for the front hydraulic system

Fig. 22. I003250

If present: Install bracket for the front power lift hydraulic line

Fig. 23. I003252

When replacing the front axle: Fit screw sockets

Fig. 24. I003253

When replacing the front axle: Fit screw sockets for the lubrication line

Fig. 25. I003254

Fit suction line

Fig. 26. I003210

Fit pressure line with filter

Fig. 27. I003208

Tighten all hydraulic lines that were loosened on the left side

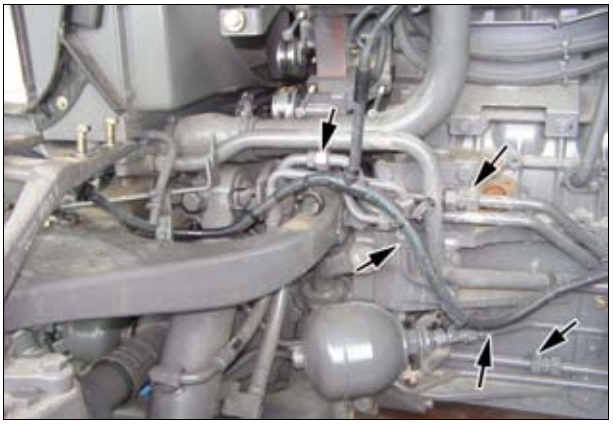

Fig. 28. I003203

Tighten all hydraulic lines that were loosened on the right side

Fig. 29. I003204

Tighten all hydraulic lines that were loosened on the central control block

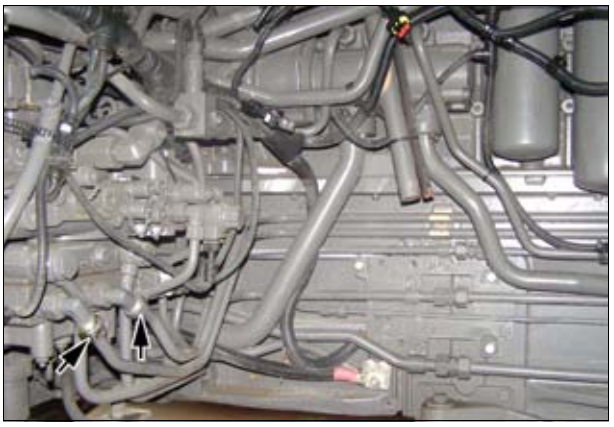

Fig. 30. I003205

Tighten all hydraulic lines that were loosened on the front cover

Fig. 31. I003419

Screw in and lock the suspension stop valves

Fig. 32. I003206

Final procedures:

– Fitting cooler assembly*see §4*

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

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Front axle/steering cylinder

3120 Front axle/steering cylinder

C Documents and diagrams 5

C Documents and diagrams

1 Technical drawing: Steering cylinder and track rod 7

1 Technical drawing: Steering cylinder and track rod

Workshop manual (DANA—front axle) X 990.005.058.000 valid for:	
Type 970/130	without front-wheel brake
Type 970/140	with front-wheel brake

– Remove steering cylinder
– Calculate if shims required
– Fit steering cylinder
– Install steering cylinder (fit to tractor)

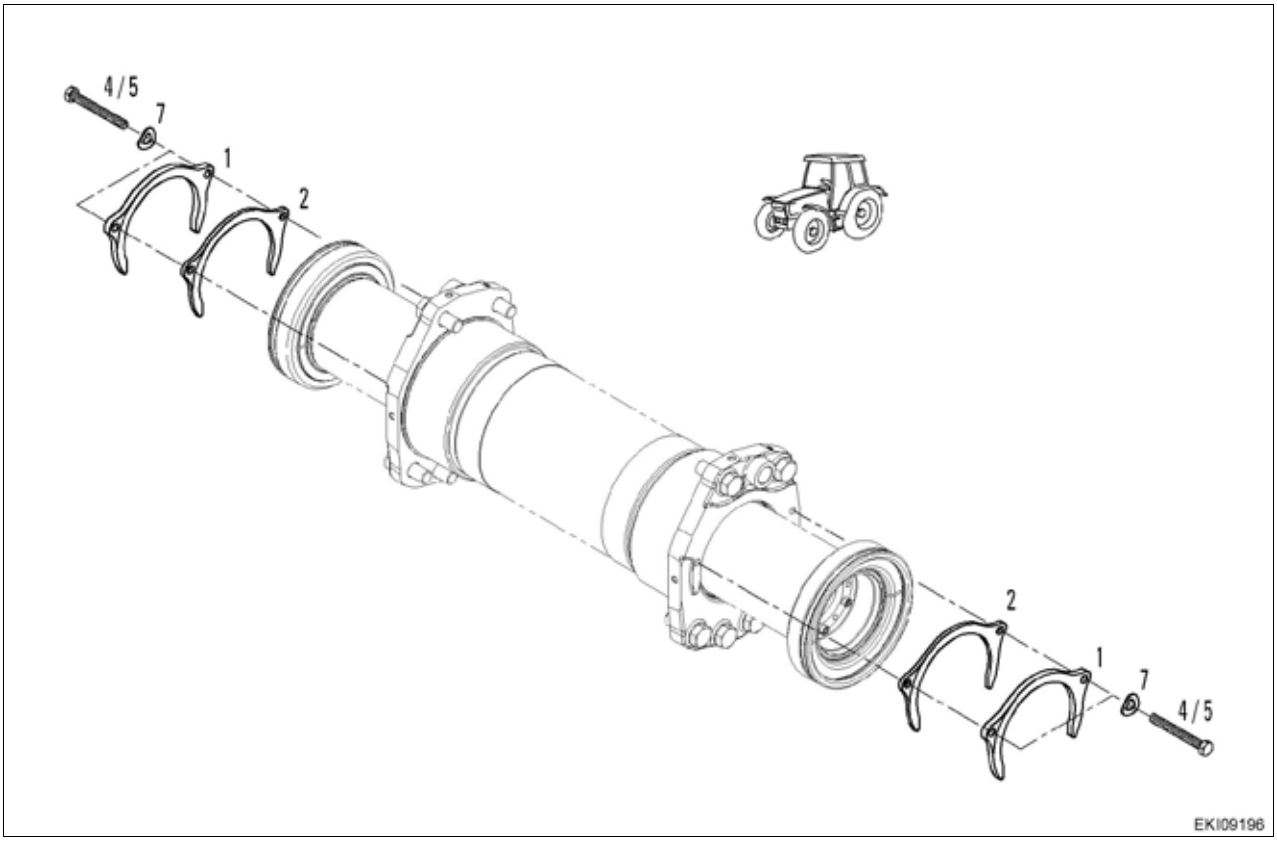

Fig. 1. I004872

Steering cylinder			
Item	**Designation**	**Item**	**Designation**
1	Shim (8 mm) (931.303.120.020) Add if required	5	Hex screw
2	Shim (5 mm) (931.303.120.010) Add if required	7	Spring washer
4	Hex screw		

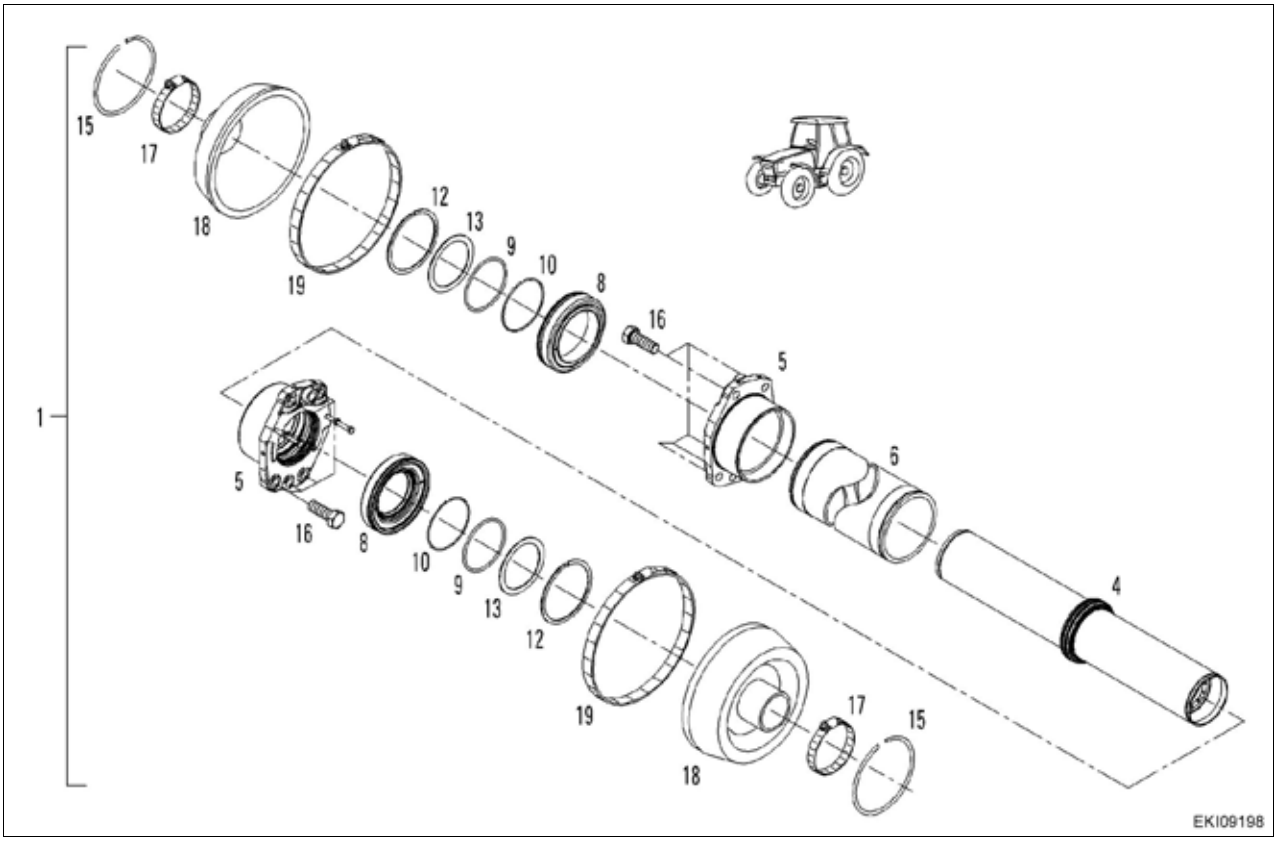

Fig. 2. I004874

Steering cylinder			
Item	**Designation**	**Item**	**Designation**
1	Steering cylinder, Seal set	12	Snap ring
4	Piston rod	13	Shim
5	Guide bush	15	Snap ring
6	Cylinder barrel	16	Hex screw
8	Stop	17	Hose clamp
9	O-ring	18	Gaiter
10	Snap ring	19	Gripper clamp

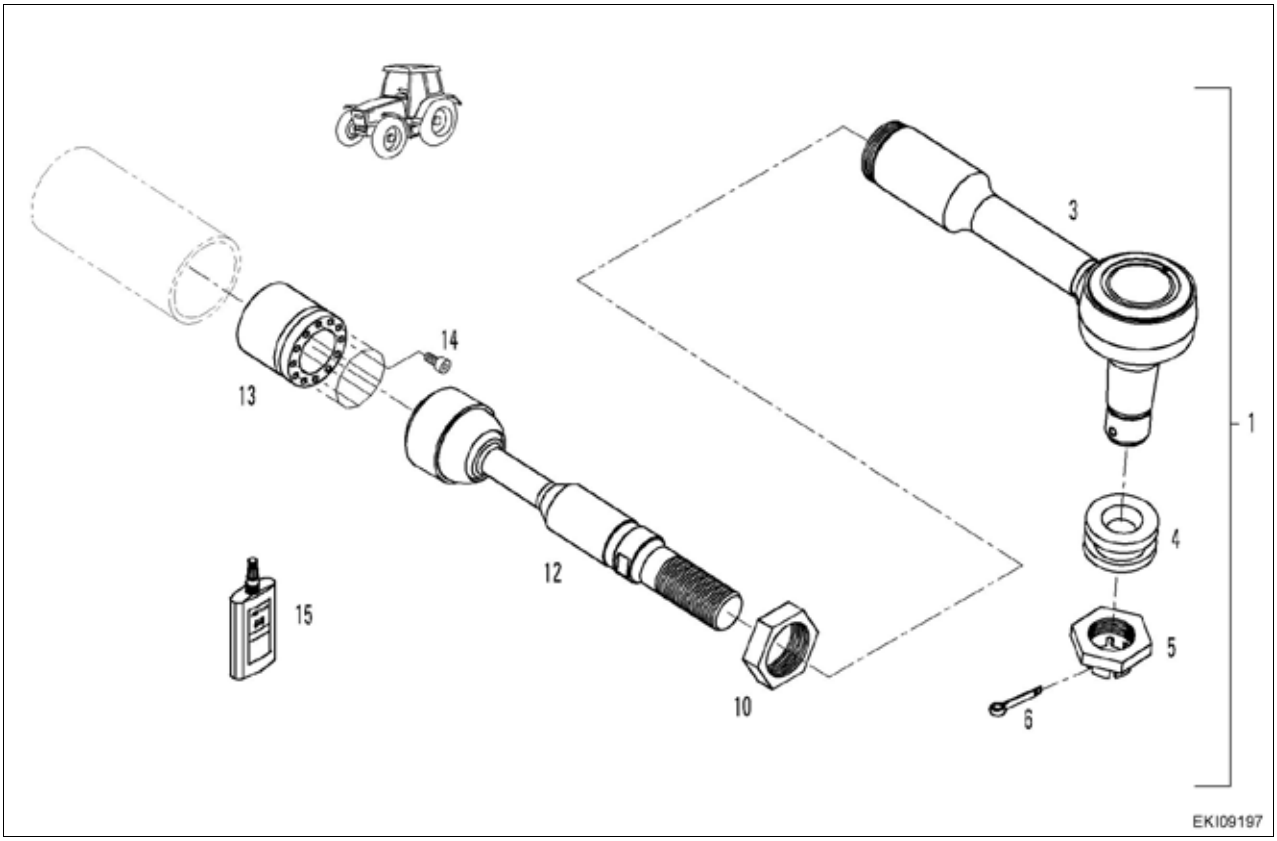

Fig. 3. I004873

Track rod			
Item	**Designation**	**Item**	**Designation**
1	Track rod	10	Hex nut
3	Application	12	Application
4	Gaiter (not available individually)	13	Jack screw
5	Castellated nut	14	Socket head cap screw
6	Split pin	15	Synthetic bonding agent (X 903.050.041.000)

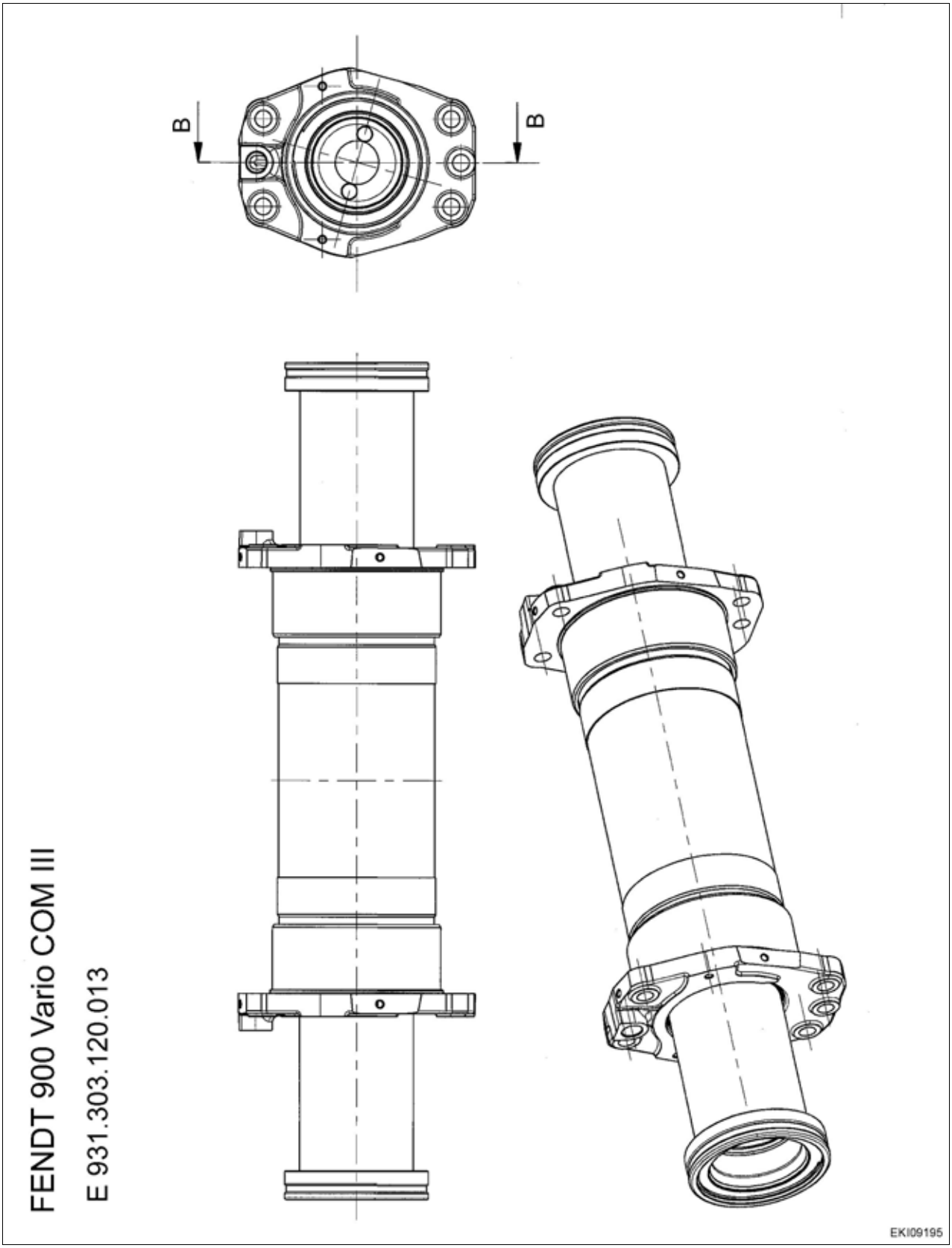

Fig. 4. Steering cylinder

I004876

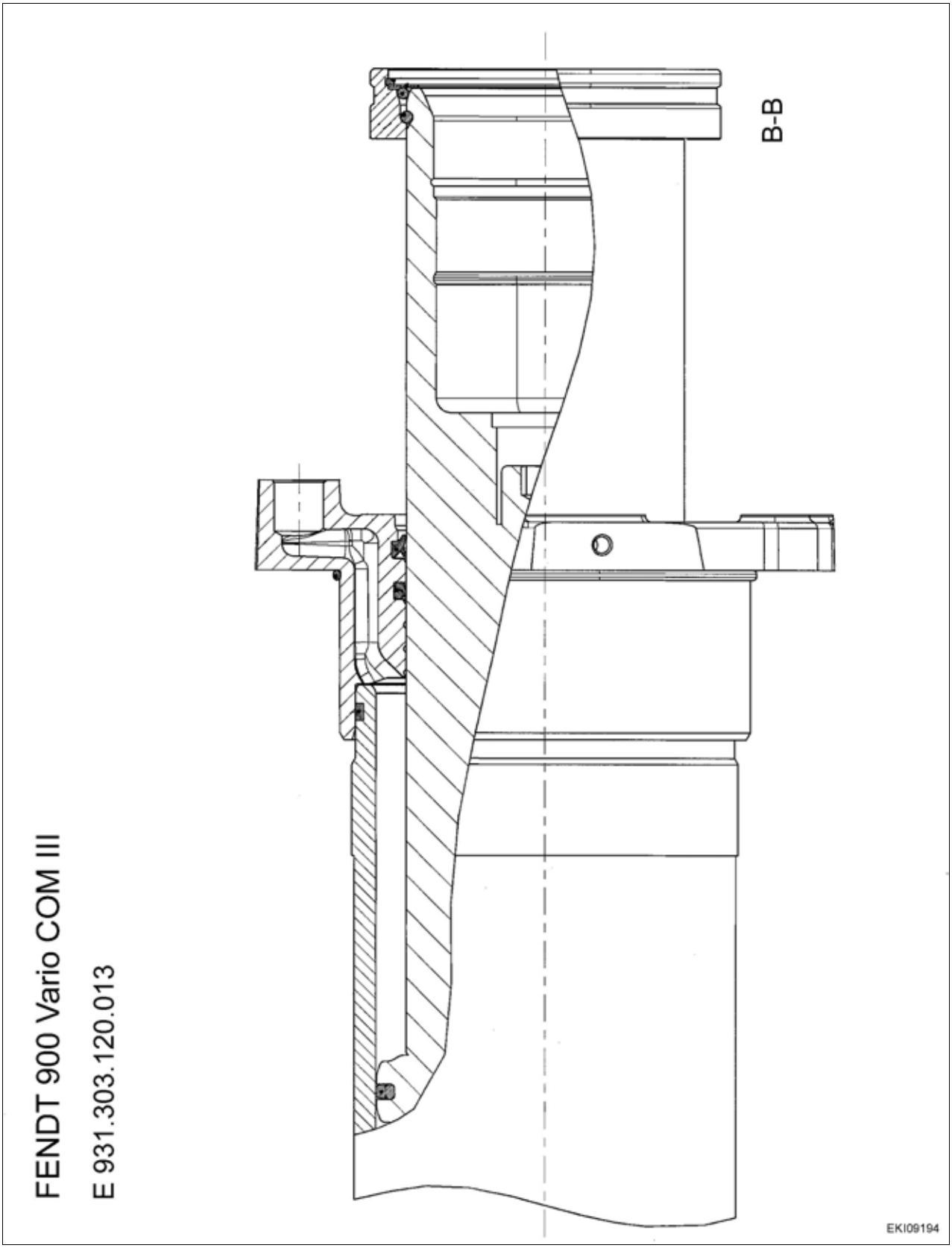

Fig. 5. Steering cylinder (seal rings) I004875

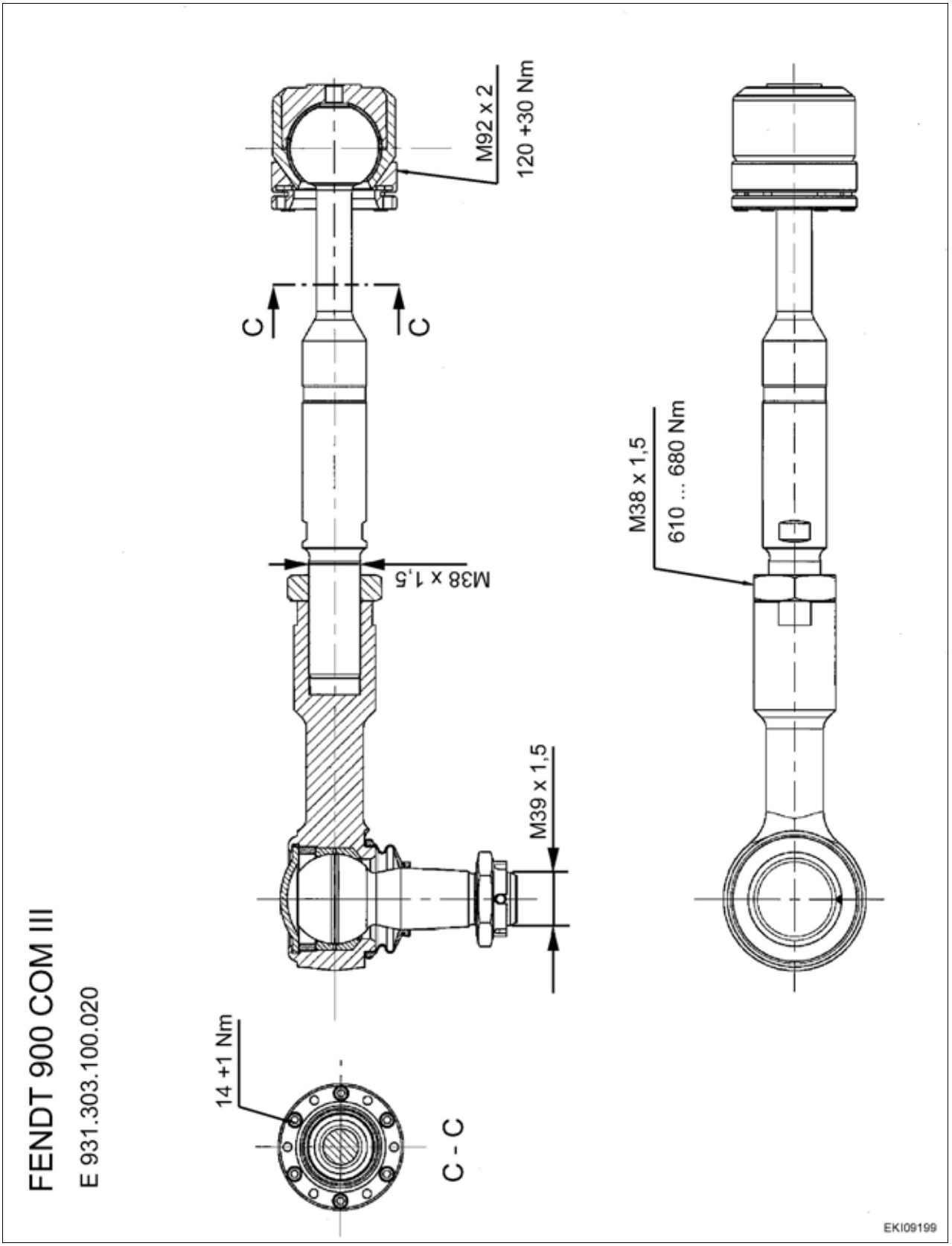

Fig. 6. Track rod

I004877

A	General
B	Faults
C	Documents and Diagrams
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E	Testing
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H	Service – Info

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Front axle/cardan shaft

3180 Front axle/cardan shaft

C Documents and diagrams 5

C Documents and diagrams

1 Technical drawing: Front-wheel drive shaft 7

1 Technical drawing: Front-wheel drive shaft

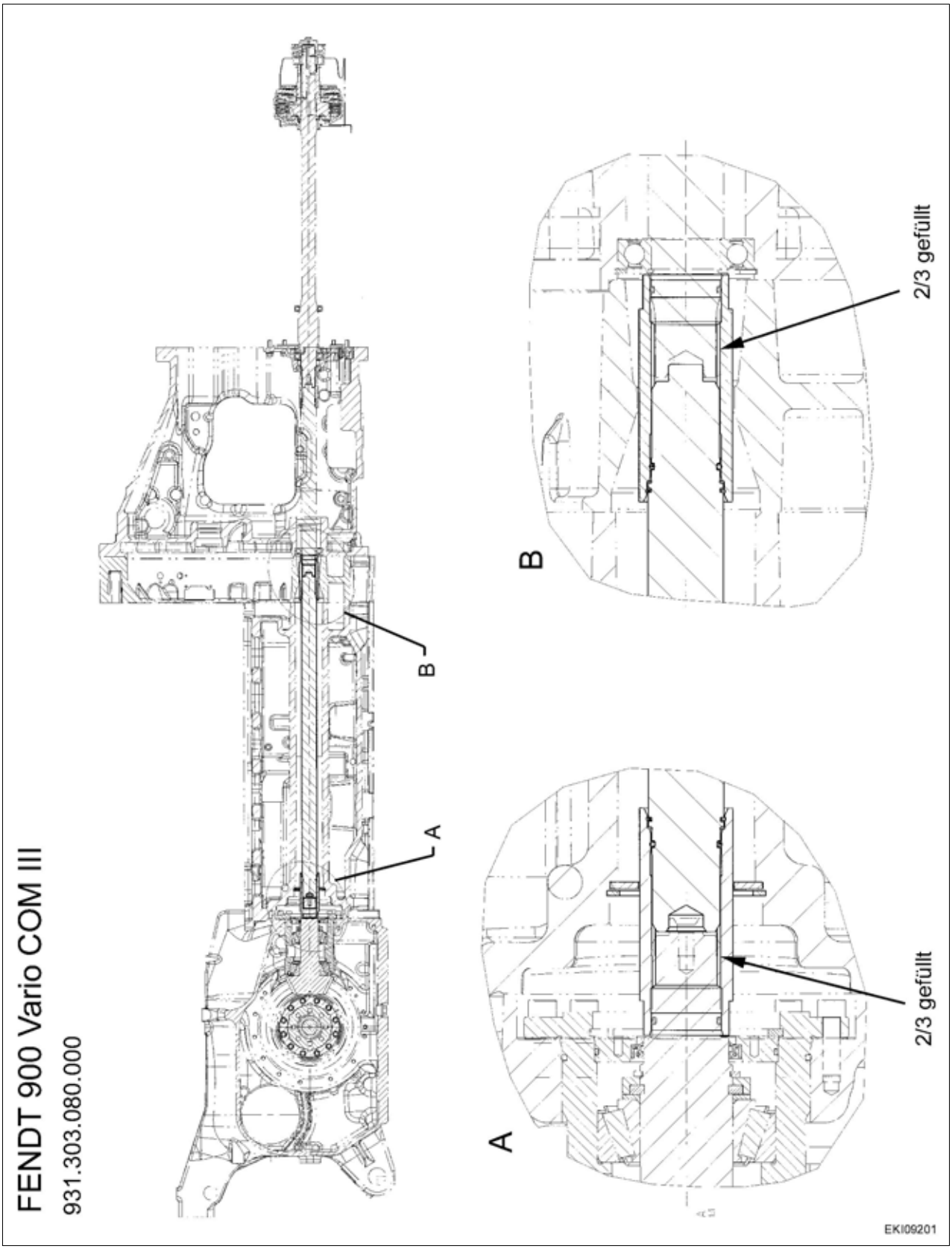

Fig. 1. I004878

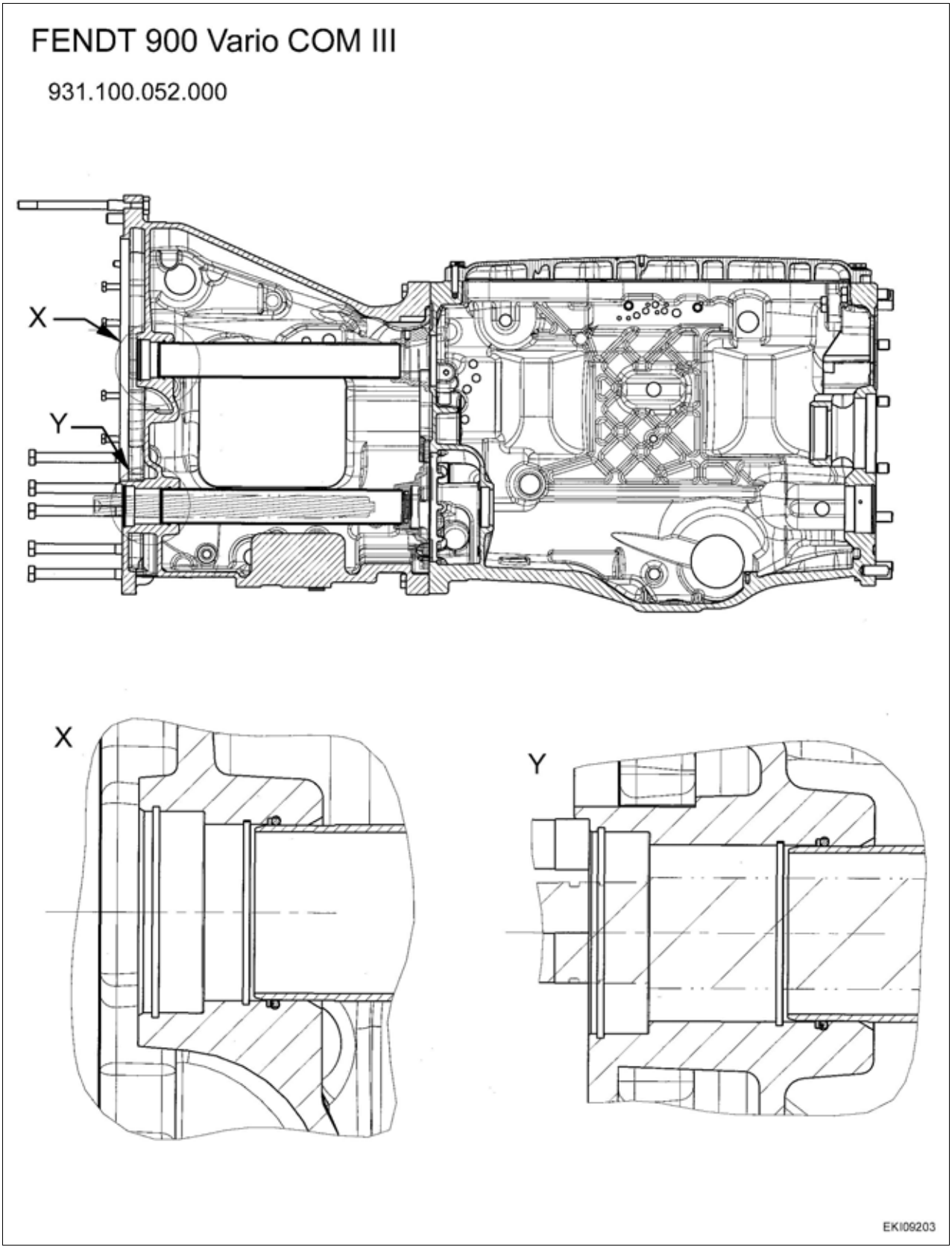

Fig. 2. I004879

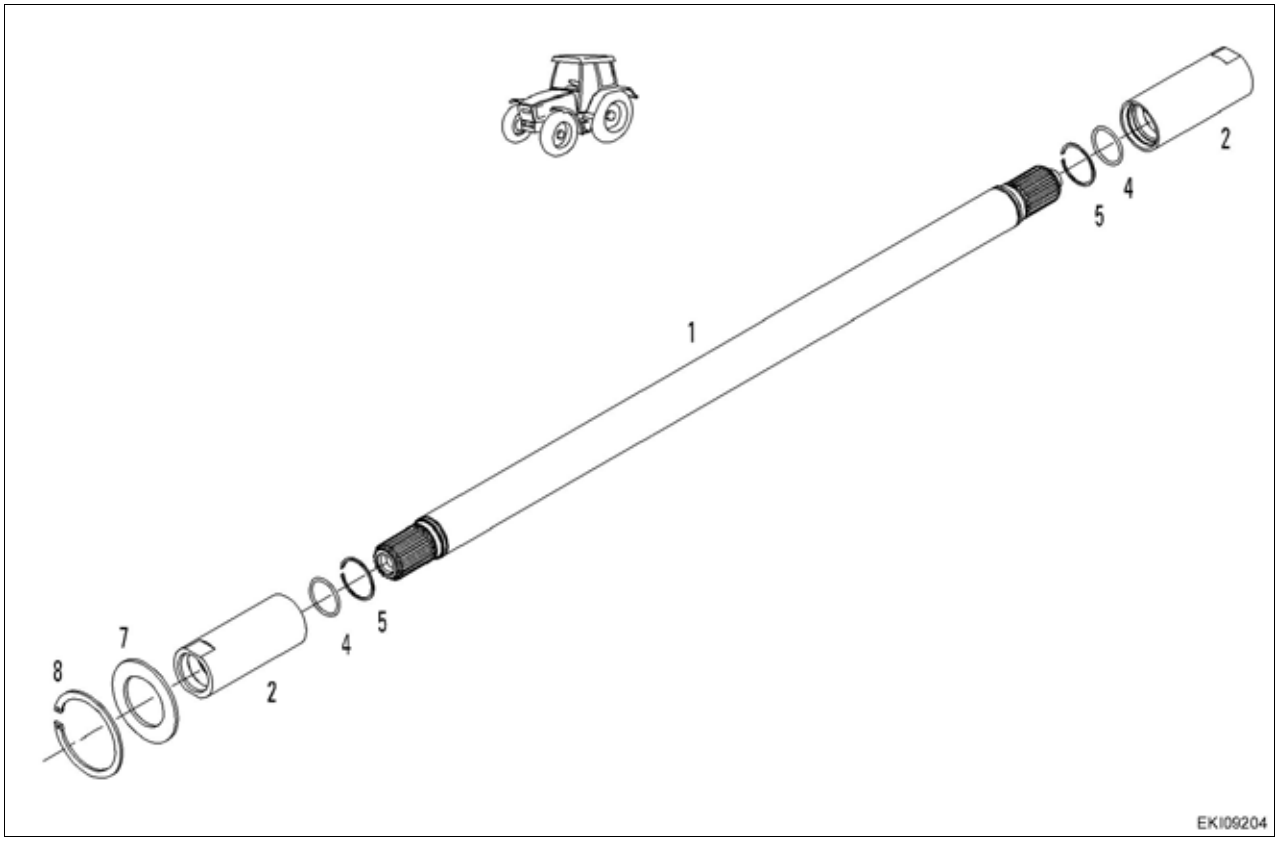

Fig. 3. I004880

Front-wheel drive shaft			
Item	**Designation**	**Item**	**Designation**
1	Shaft	5	Snap ring
2	Profile connector	7	Washer
4	O-ring	8	Circlip

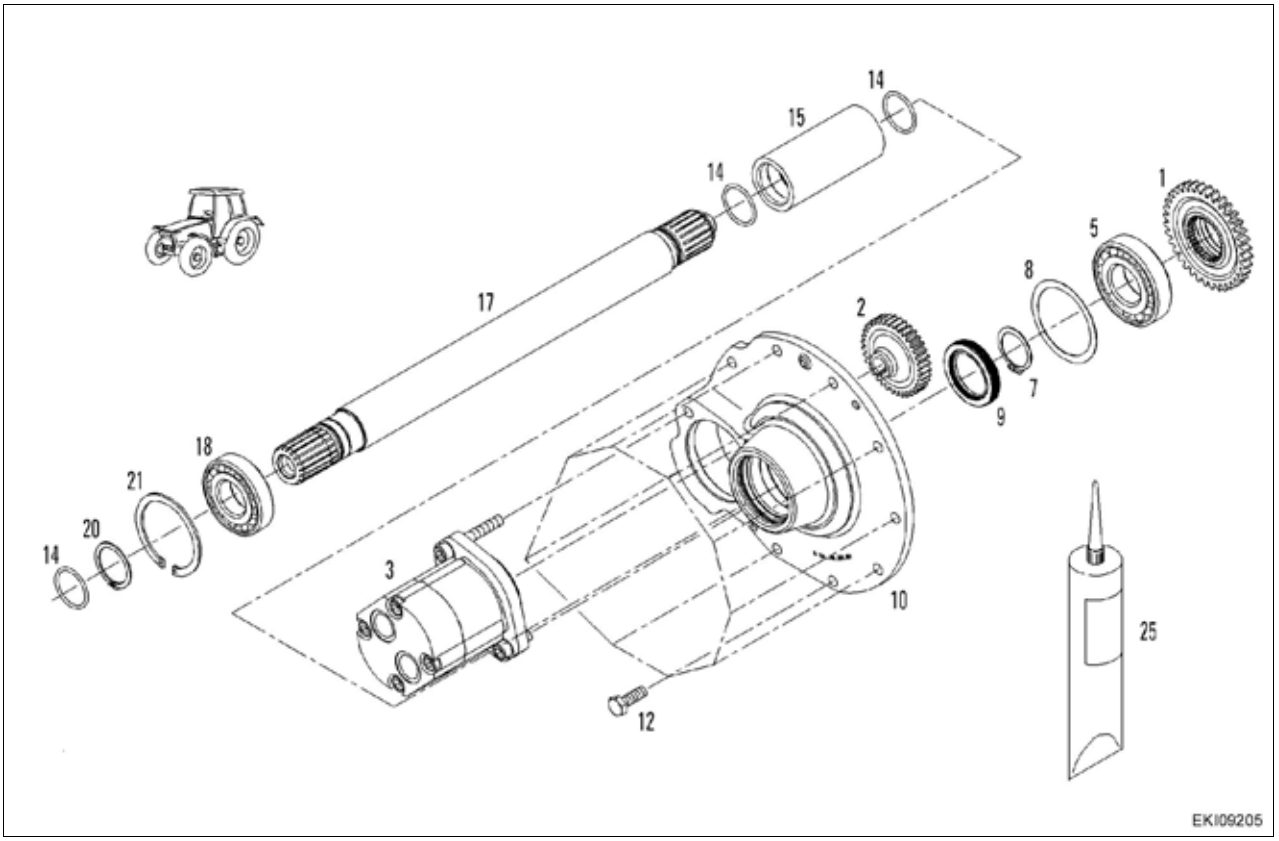

Fig. 4. I004881

Front-wheel drive shaft			
Item	**Designation**	**Item**	**Designation**
1	Spur gear	12	Hex screw
2	Spur gear	14	O-ring
3	wheel-driven emergency steering pump (PNL)	15	Profile connector
5	Deep-groove ball bearing	17	Shaft
7	Circlip	18	Deep-groove ball bearing
8	Shim pack	20	Circlip
9	Shaft seal ring	21	Circlip
10	Bearing cover	25	Synthetic bonding agent (X903.050.074.000)

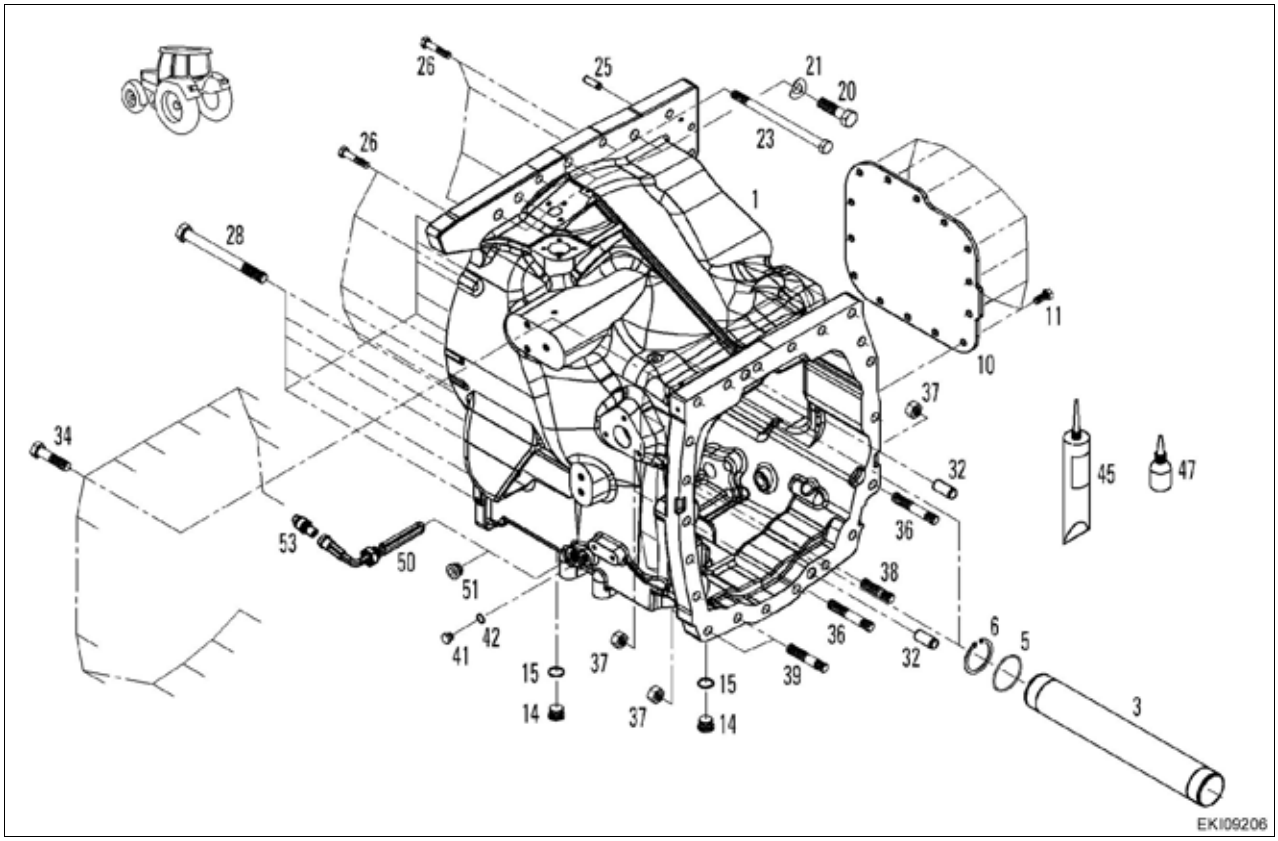

Fig. 5. I004882

Clutch housing			
Item	**Designation**	**Item**	**Designation**
1	Clutch housing	28	Hex screw
3	Sleeve	32	Parallel pin
5	O-ring	34	Hex screw
6	Circlip	36	Stud bolt
10	Cover	37	Hex nut
11	Hex screw	38	Stud bolt
14	Screw plug	39	Stud bolt
15	Seal ring	41	Screw plug
20	Hex screw	42	Seal ring
21	Spring washer	45	Sealant (X903.050.074.000)
23	Hex screw	47	Synthetic bonding agent (X903.050.084.000)
25	Parallel pin	50	Heater element
26	Hex screw	51	Screw plug