Werkstatthandbuch
Workshopmanual
Manuel d´atelier
Manual de taller
Manuale per l´officina
Werkplaatshandboek

FENDT 900 Vario COM III

X 990.005.057.012

1

FENDT

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3000

Overall system/front axle

FENDT 900 Vario - COM III

Volume 1

Volume 2

Volume 3

FENDT 900 Vario - COM III

Volume 4

3000 Overall system/front axle

A General

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

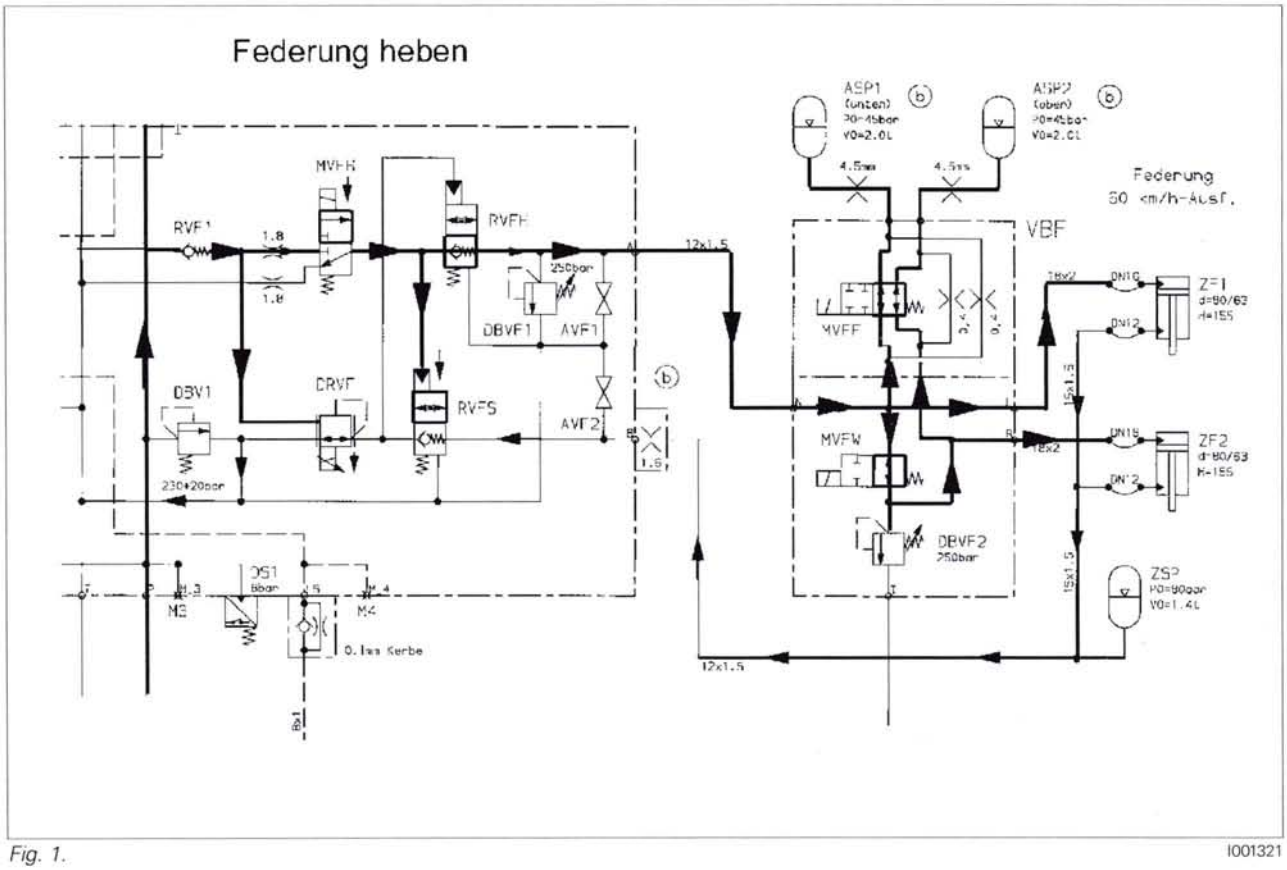


Fig. 1. I001321

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.

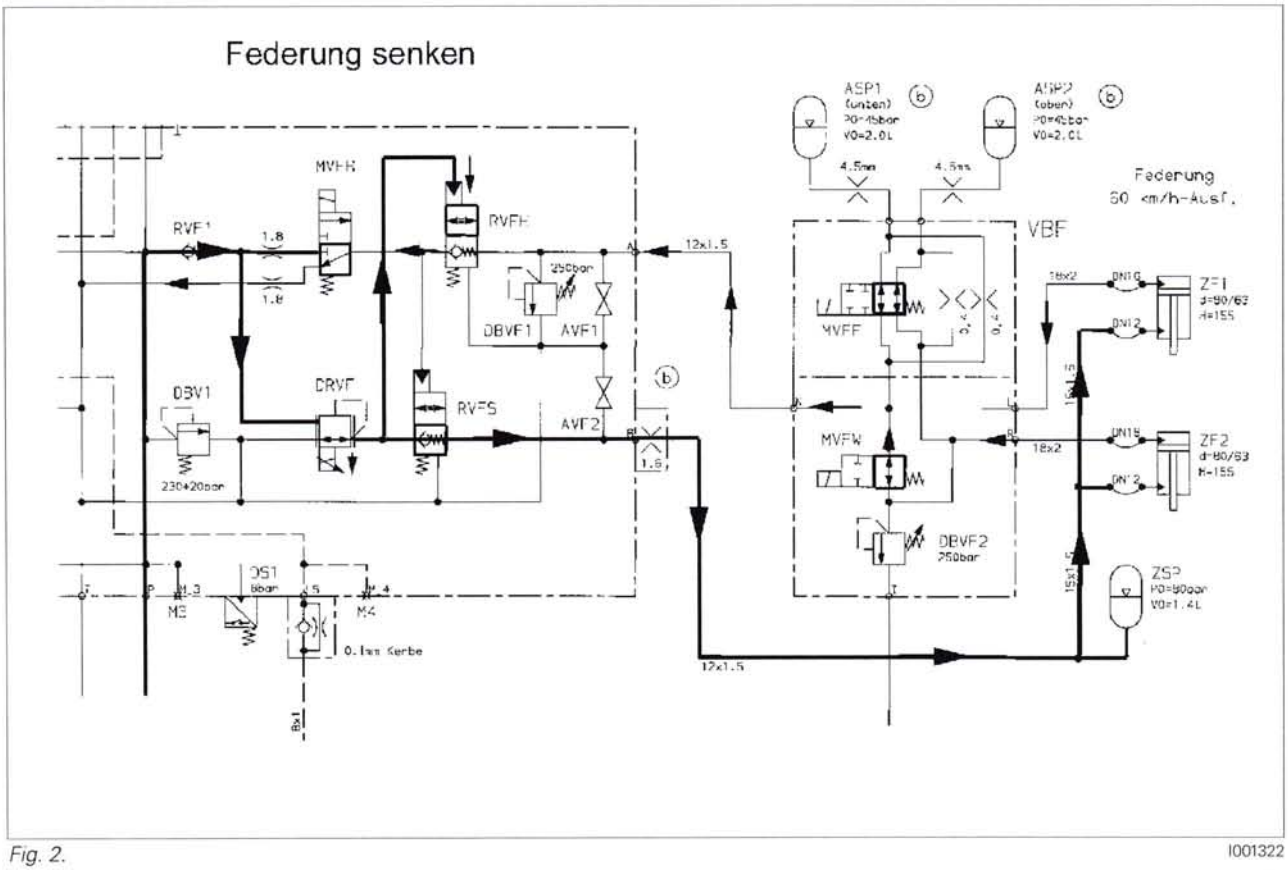


Fig. 2. I001322

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.*

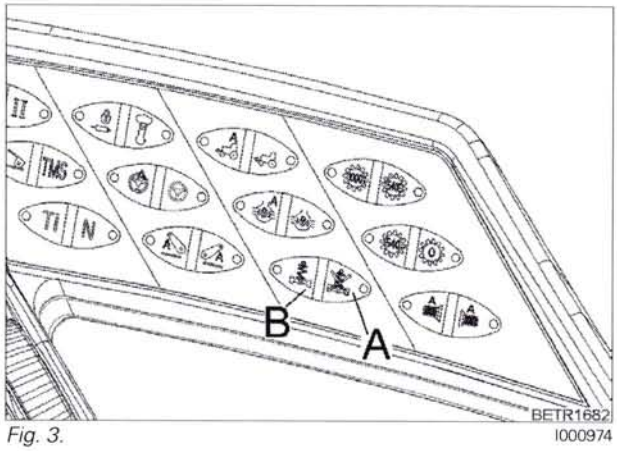


Fig. 3. I000974

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.

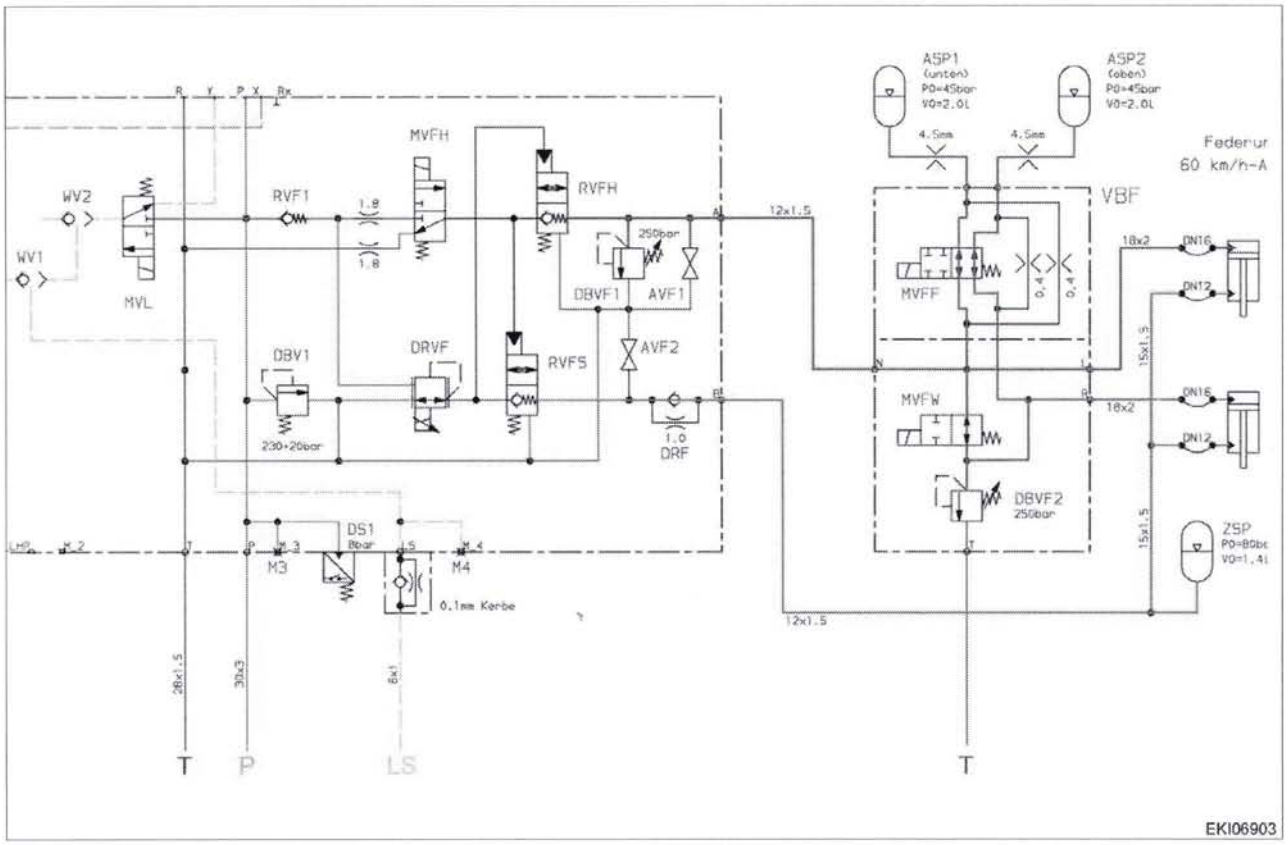


Fig. 4.
I007357

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-

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

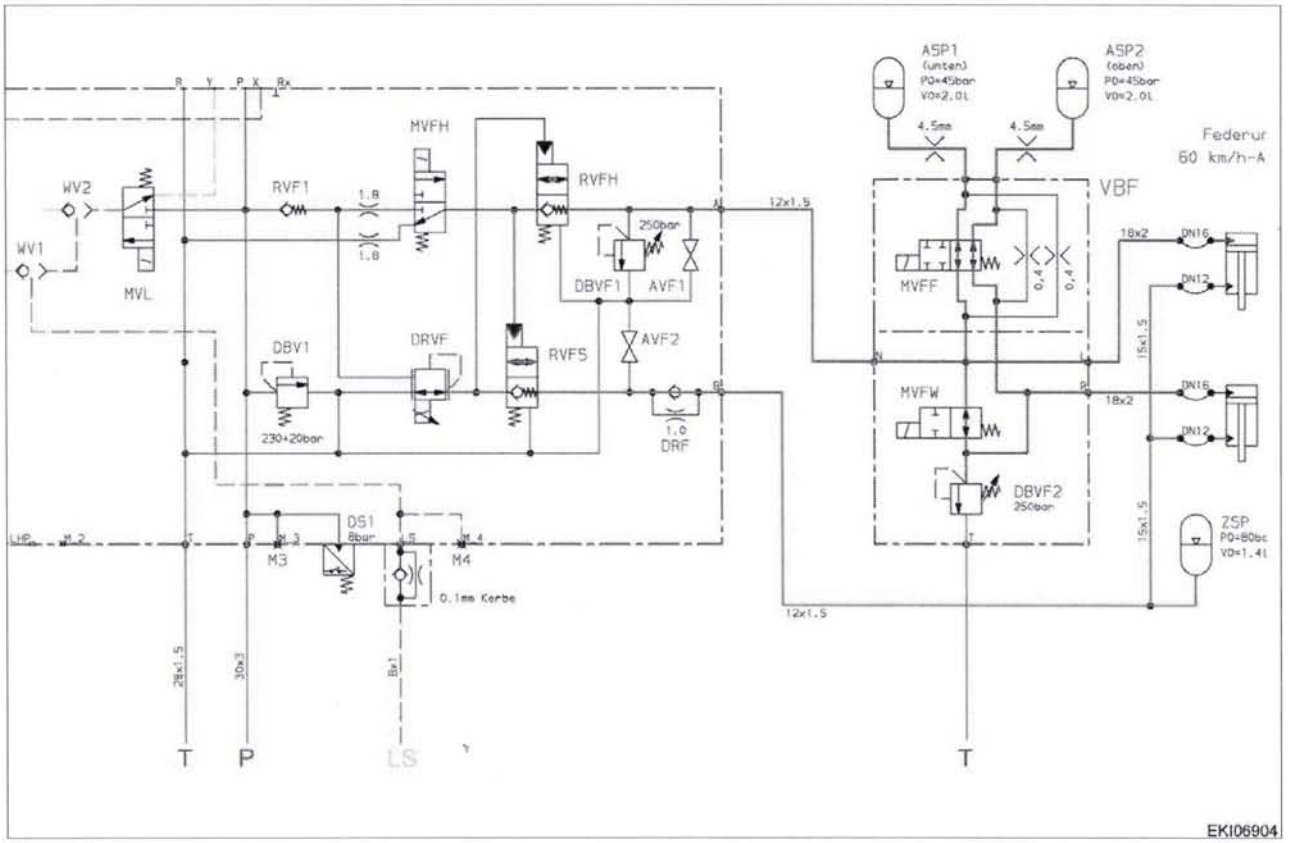


Fig. 5. I007358

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

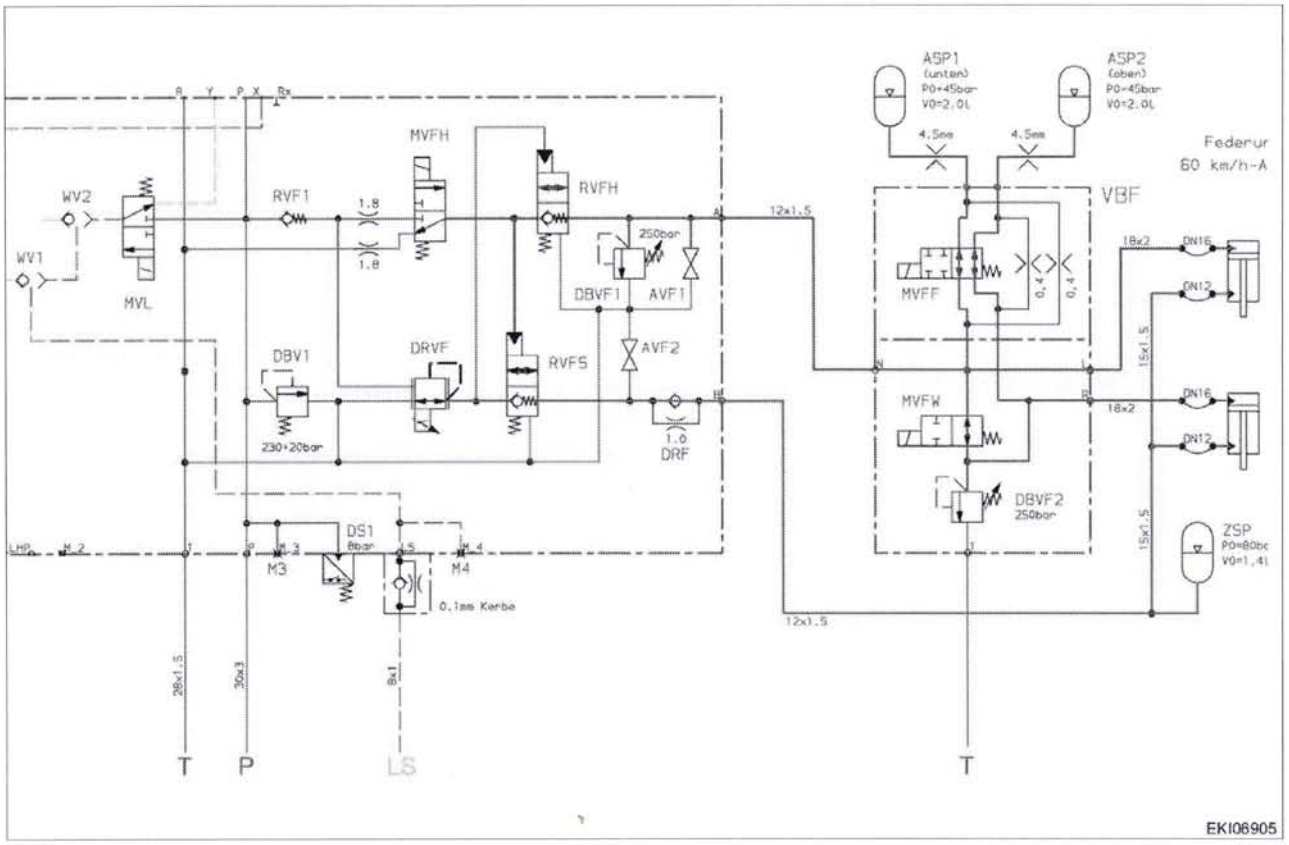


Fig. 6.

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.

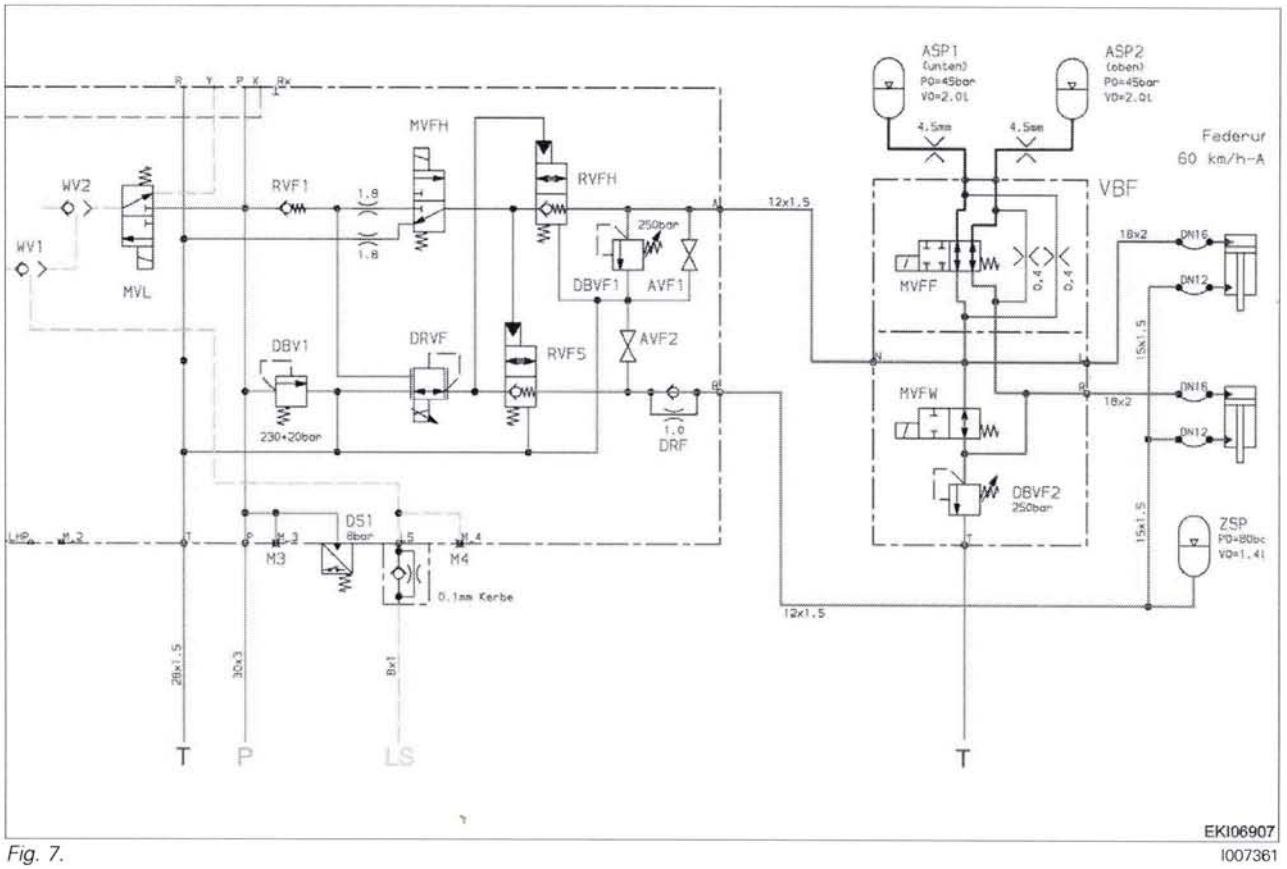


Fig. 7.

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.

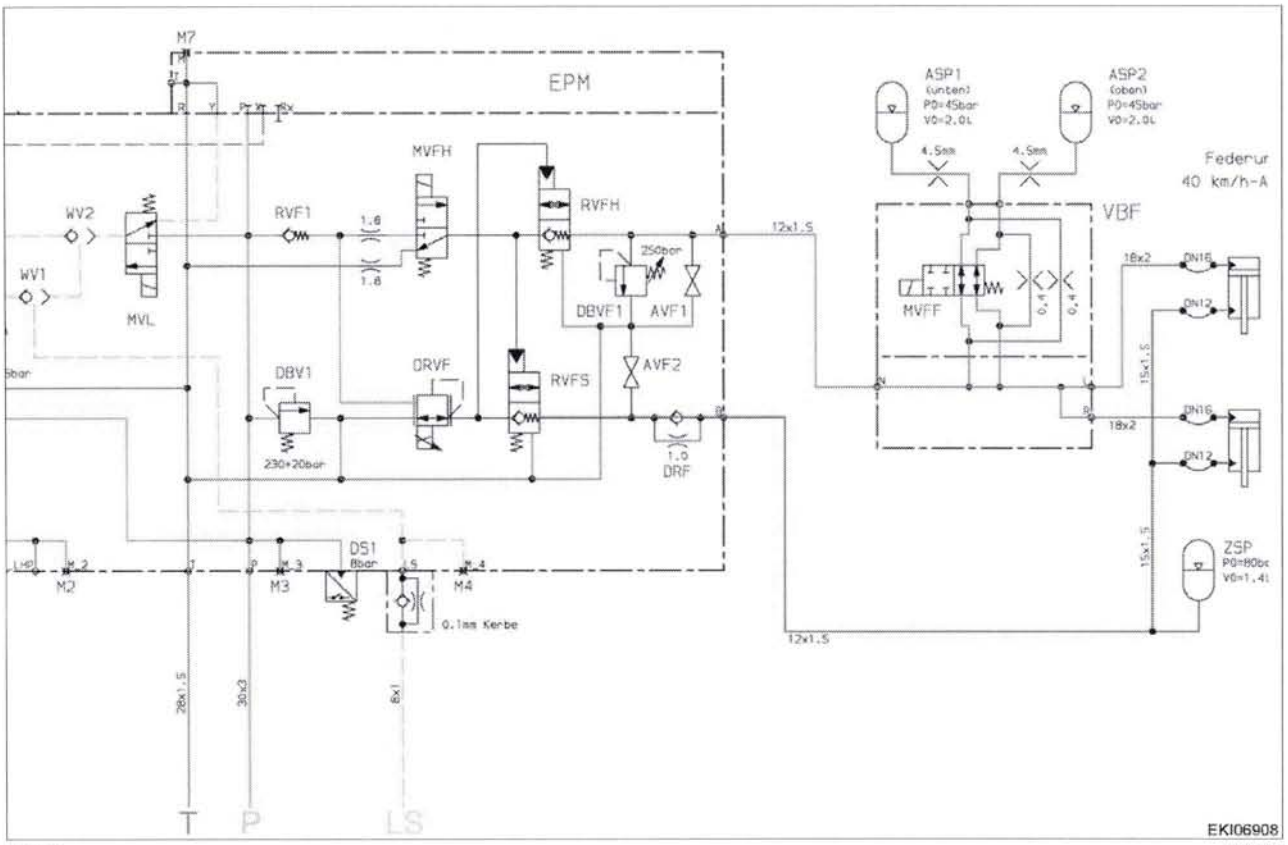


Fig. 8. I007362

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).

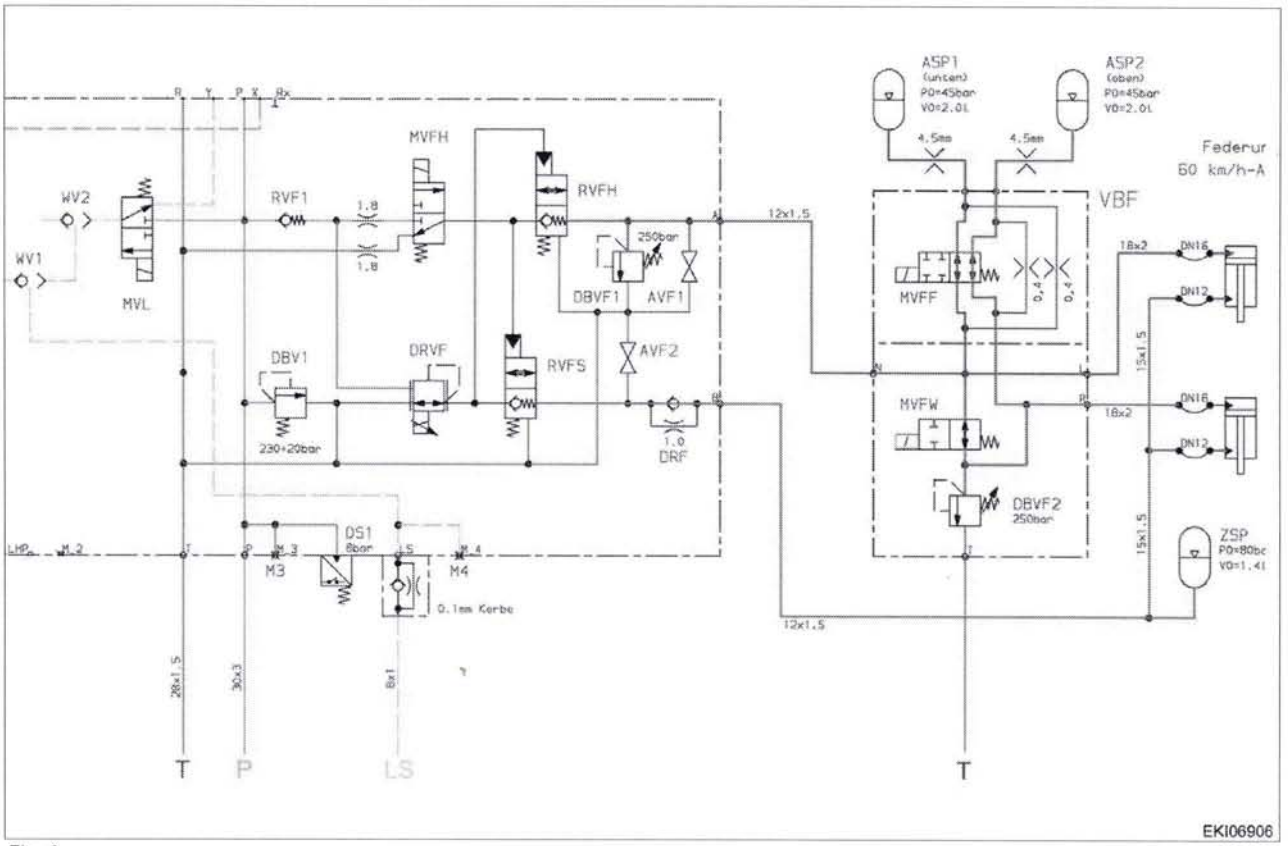


Fig. 9.

I007360

Wobble stabiliser diagnostics

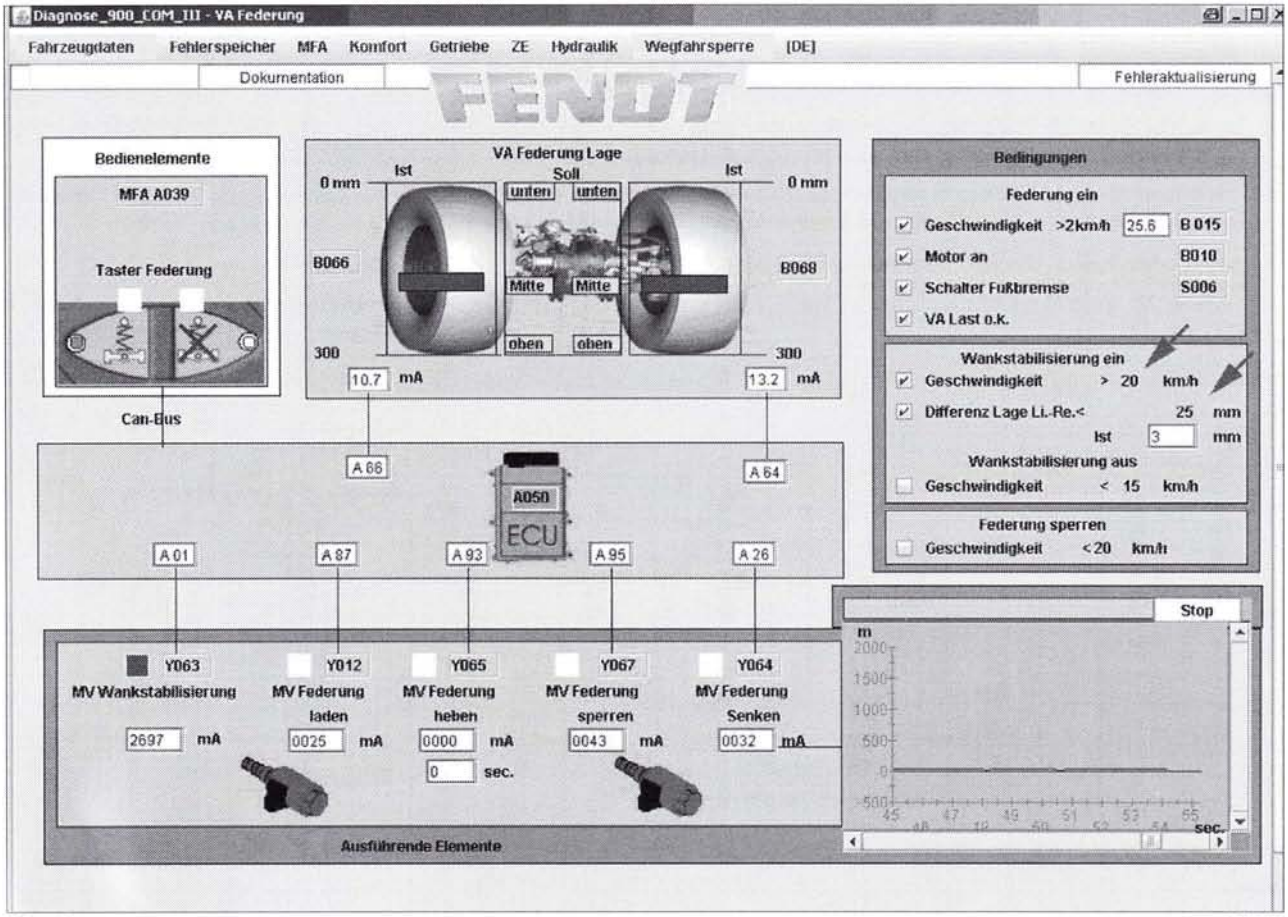


Fig. 10. I010491

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

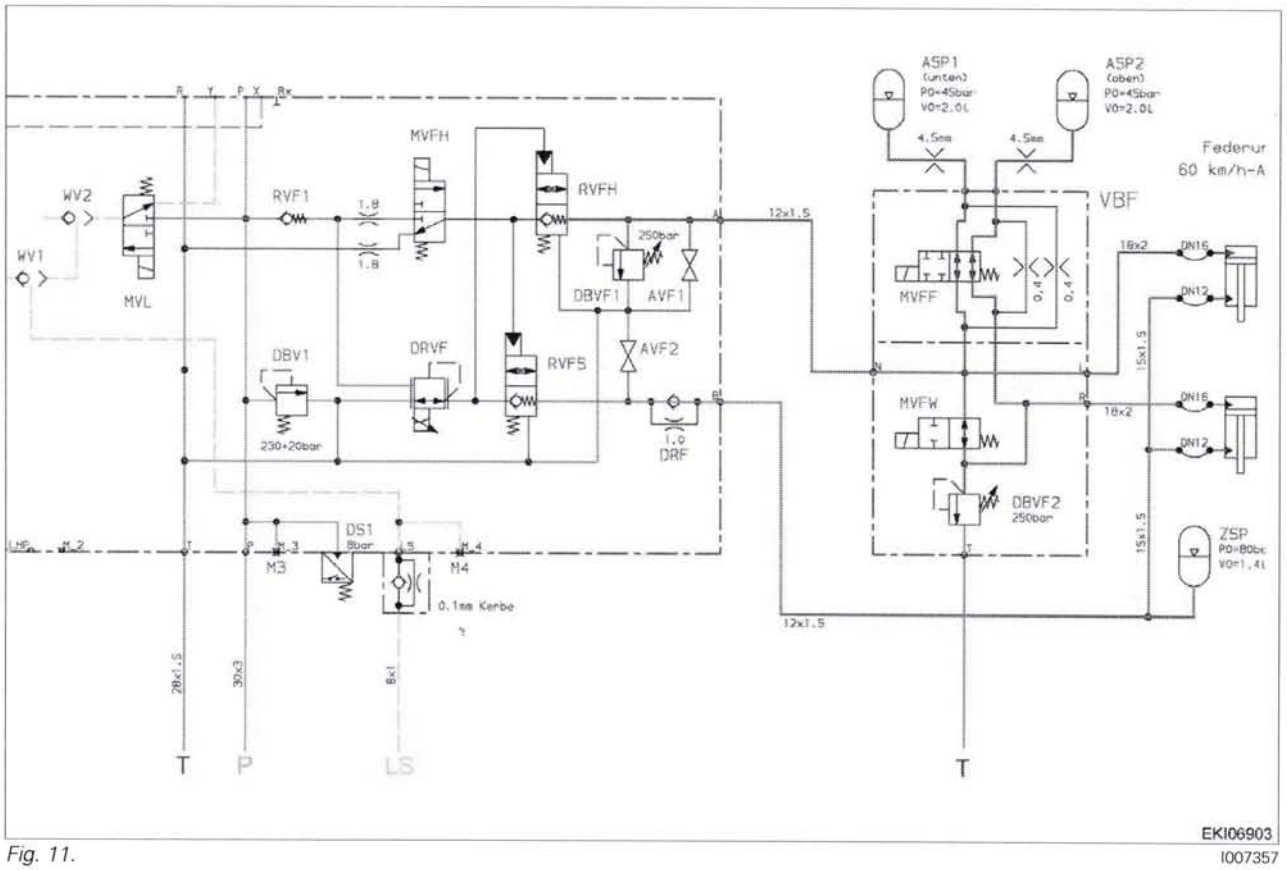


Fig. 11.

I007357

G Repair

1 Removing front axle

Preliminary work:

– Remove cooler assembly*see §3*

Disconnect all cable connectors in the area of the front axle and attach them to the engine

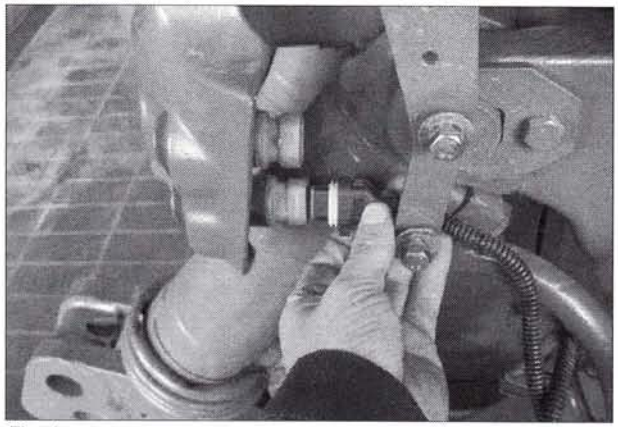


Fig. 1. I003201

Relieve pressure on the front axle suspension accumulator (open both suspension lock valves)

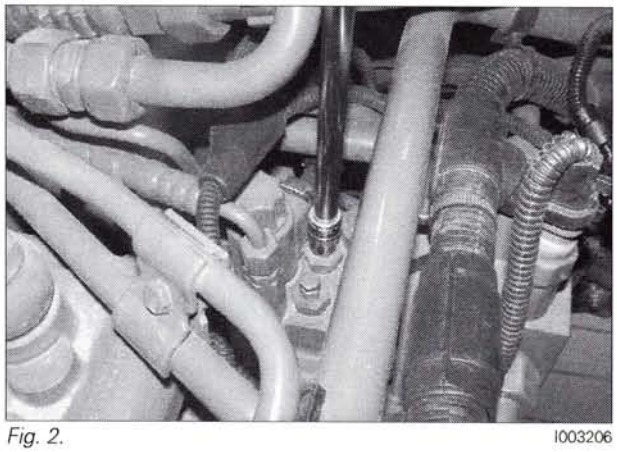


Fig. 2. I003206

Remove hydraulic lines (arrows) on the left side

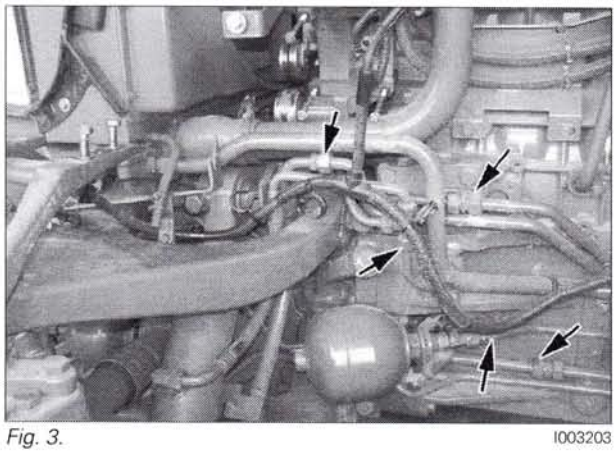


Fig. 3. I003203

Remove front axle suspension diaphragm accumulator

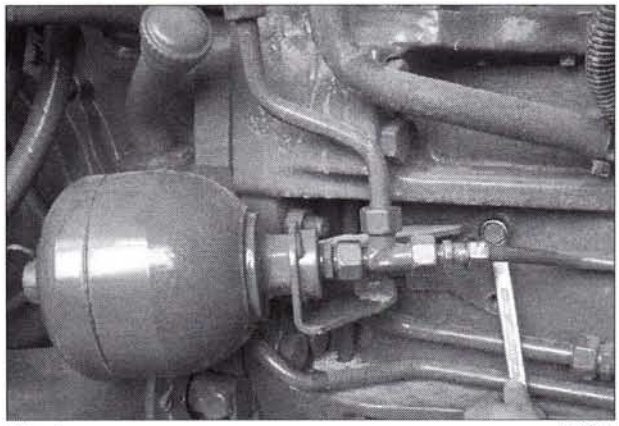


Fig. 4. I003207

Remove hydraulic lines (arrows) on the right side (may vary according to equipment)

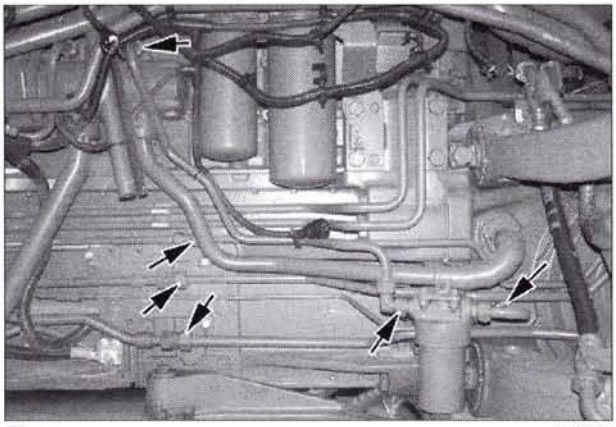


Fig. 5. I003204

Remove hydraulic lines of the auxiliary control valves in the middle (arrows) (may vary according to equipment)

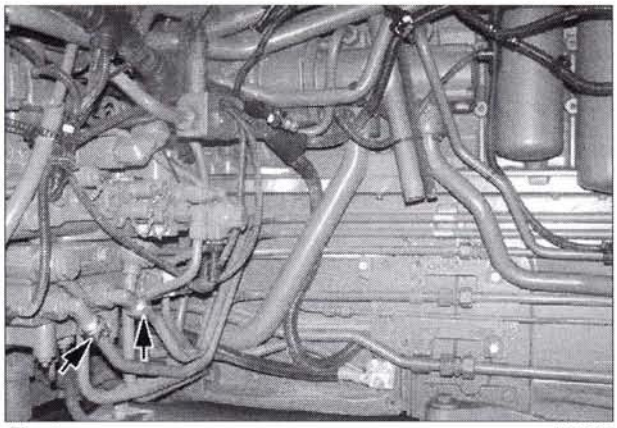


Fig. 6. I003205

Remove hydraulic lines from the front cover (may vary according to equipment)

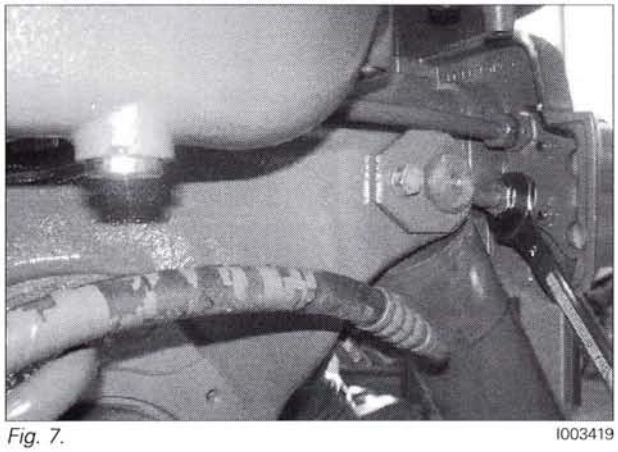


Fig. 7. I003419

Remove filter for front axle (if present) together with hydraulic line

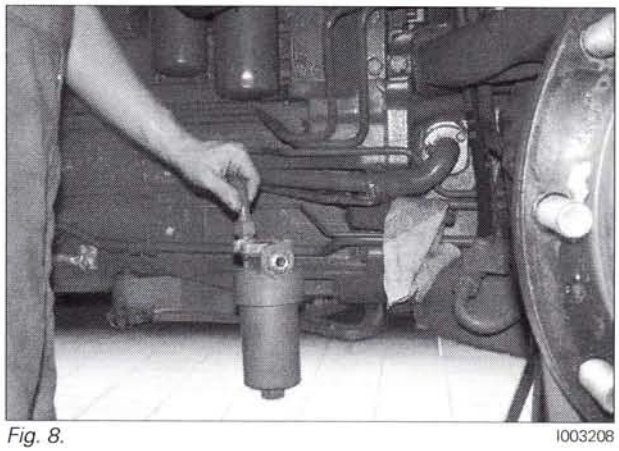


Fig. 8. I003208

Remove front axle suction line (if present)

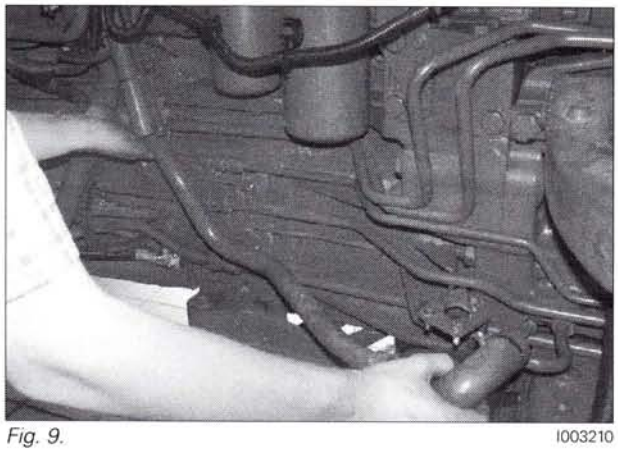


Fig. 9. I003210

Place assembly trestle under engine, carefully lift the front axle and remove the connecting bolts between the engine and the front axle

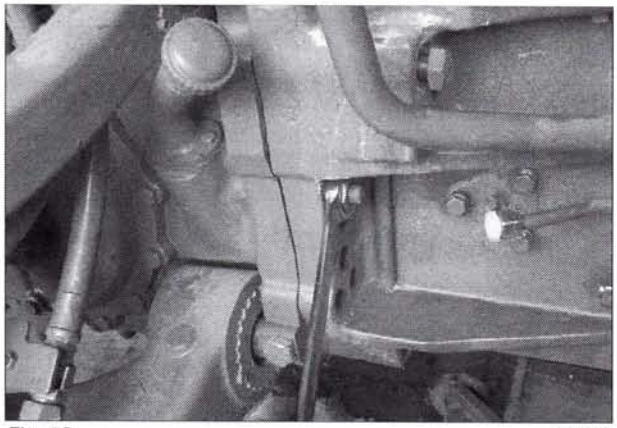


Fig. 10. I003214

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!

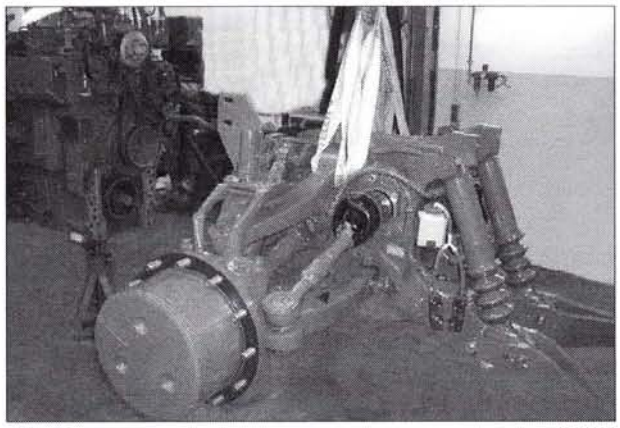


Fig. 12. I004194

Tighten flange screws
Tightening torque: 580 Nm

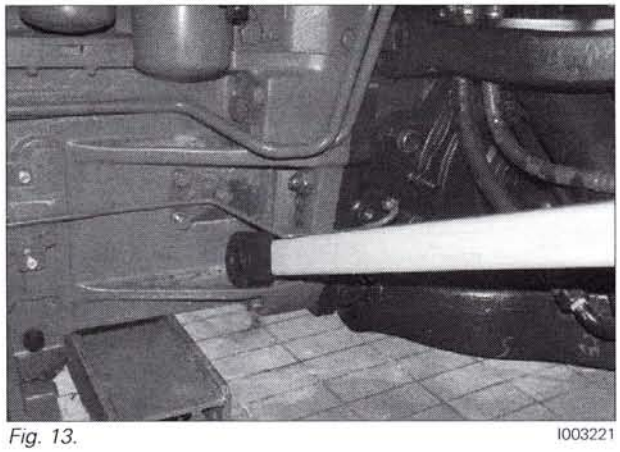


Fig. 13. I003221

Install the suspension diaphragm accumulator and connect hydraulic lines

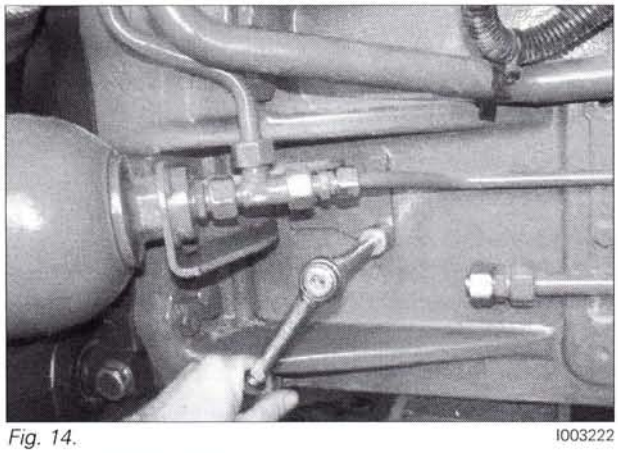


Fig. 14. I003222

When replacing the front axle: Remove plug for brake line

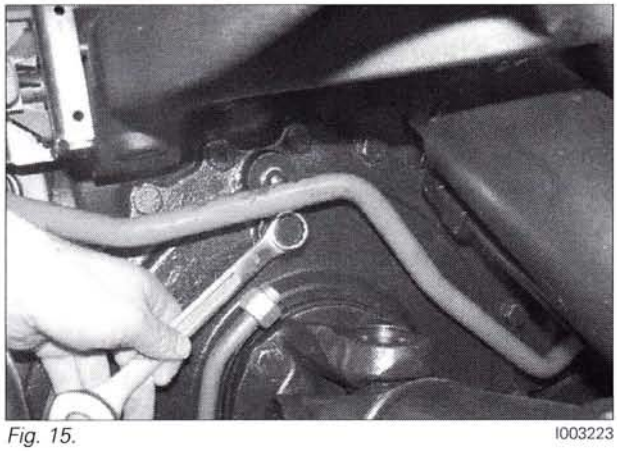


Fig. 15. I003223

When replacing the front axle: Fit screw sockets for brake line

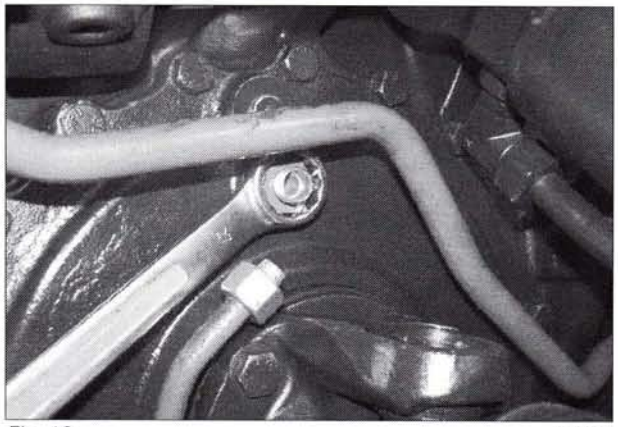


Fig. 16. I003224

When replacing the front axle: Install brake line from the front

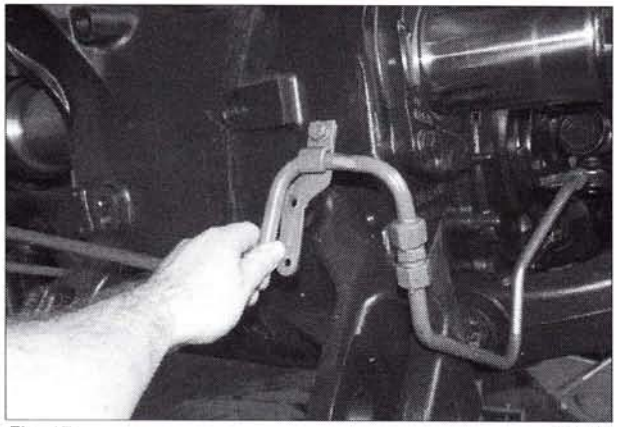


Fig. 17. I003225

Connect brake line on the left and right

Fig. 18. I003226

Connect brake line

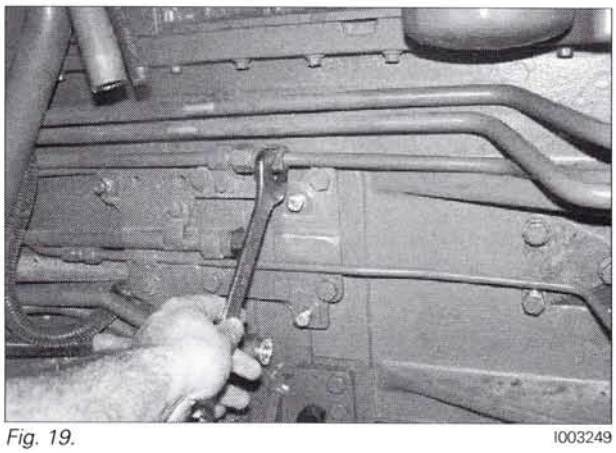


Fig. 19. I003249

When replacing the front axle: Fit screw sockets for steering hydraulic system

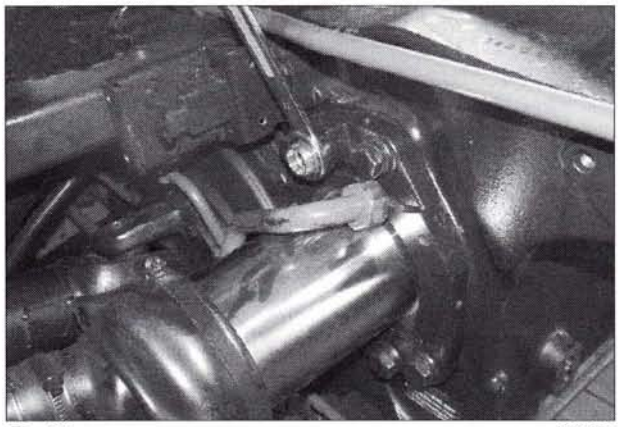


Fig. 20. I003251

Install line for the steering hydraulic system

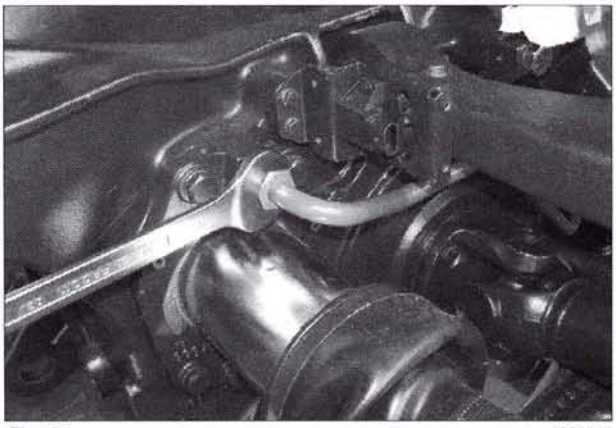


Fig. 21. I003248

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

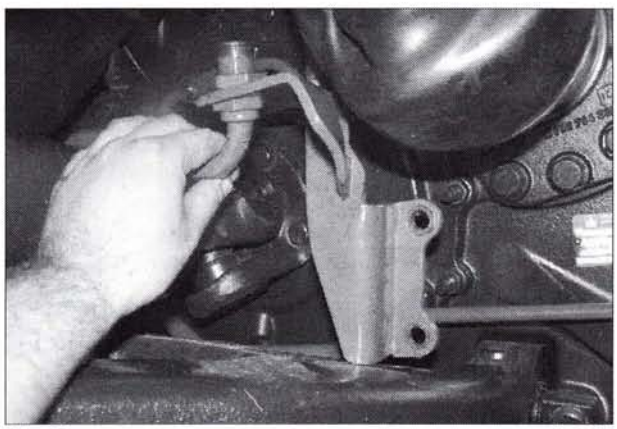


Fig. 23. I003252

When replacing the front axle: Fit screw sockets

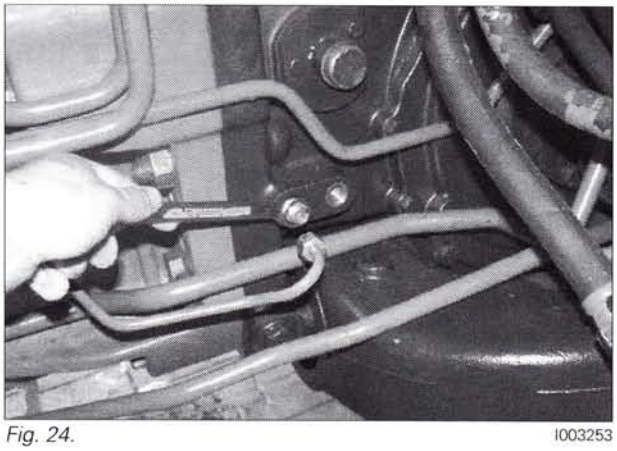


Fig. 24. I003253

When replacing the front axle: Fit screw sockets for the lubrication line

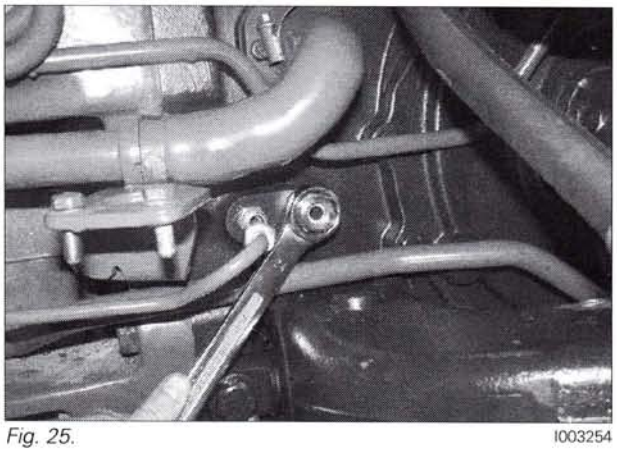


Fig. 25. I003254

Fit suction line

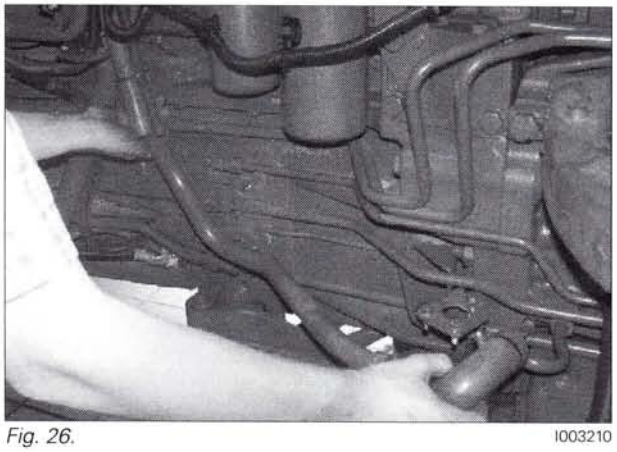


Fig. 26. I003210

Fit pressure line with filter

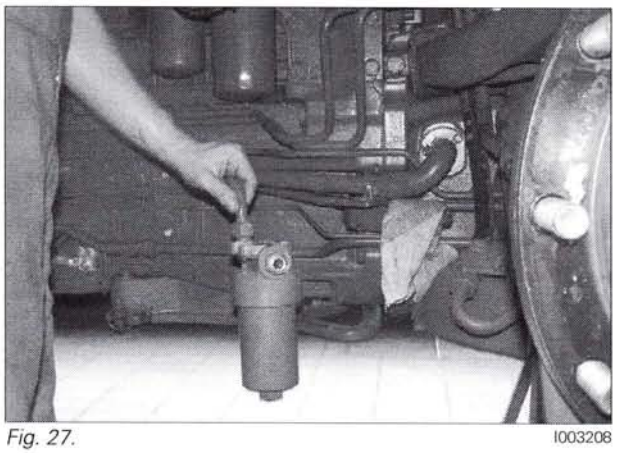


Fig. 27. I003208

Tighten all hydraulic lines that were loosened on the left side

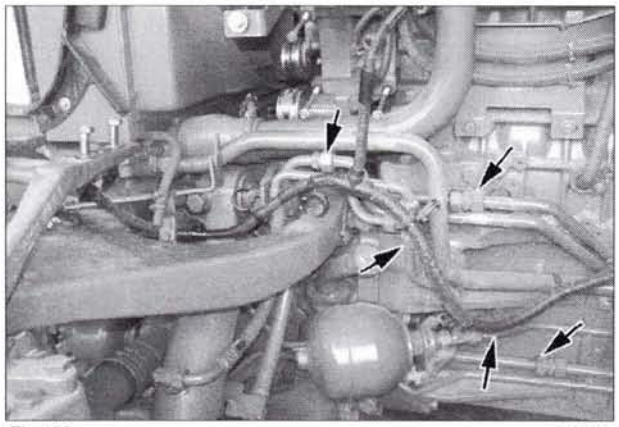


Fig. 28. I003203

Tighten all hydraulic lines that were loosened on the right side

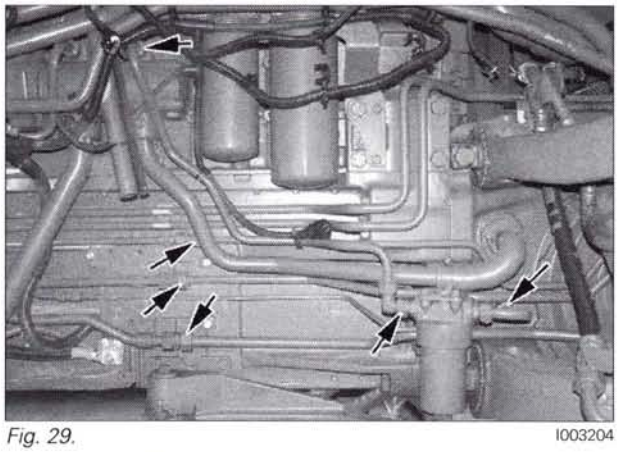


Fig. 29. I003204

Tighten all hydraulic lines that were loosened on the central control block

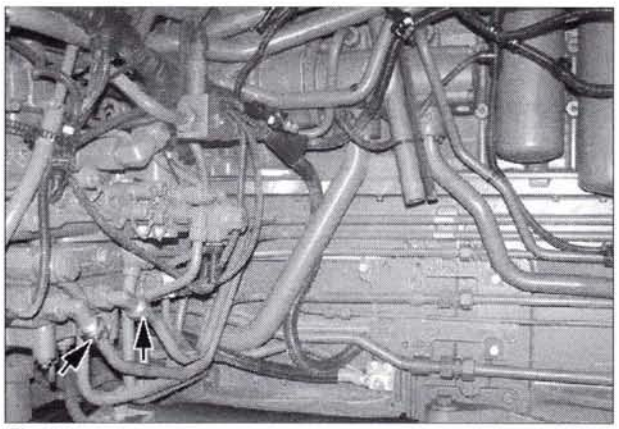


Fig. 30. I003205

Tighten all hydraulic lines that were loosened on the front cover

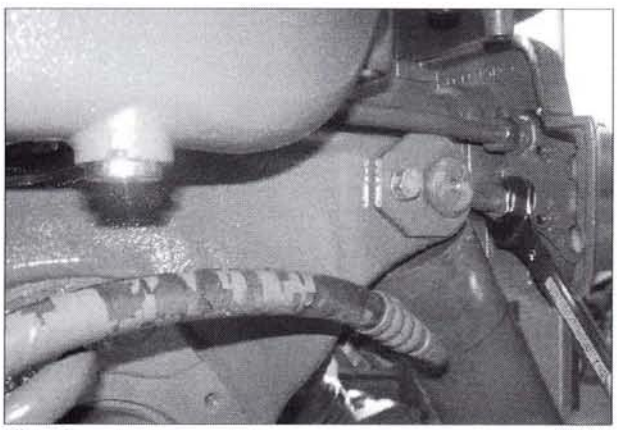
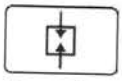


Fig. 31. I003419



Screw in and lock the suspension stop valves

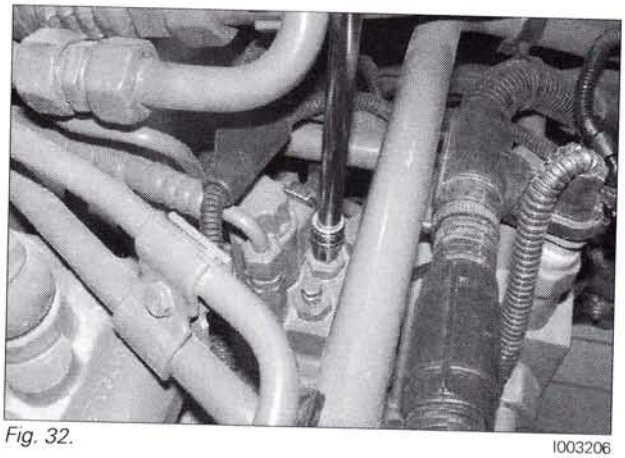


Fig. 32. I003206

Final procedures:

- Fitting cooler assembly *see §4*