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

***FENDT 900 Vario COM III***

**X 990.005.057.012**

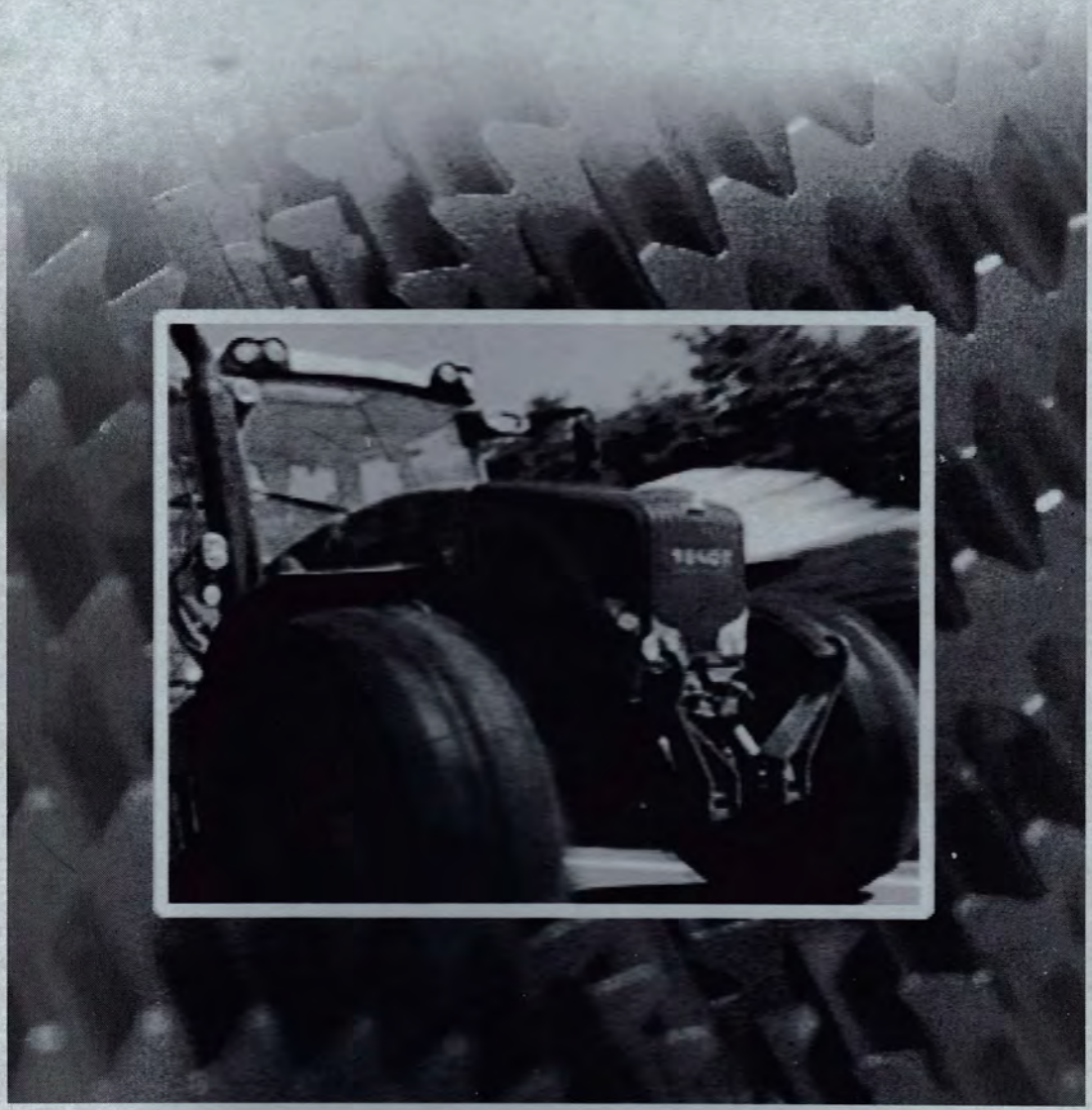
**1**

FENDT

# Workshop Service Manual

# FENDT 900 Vario - COM III

*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-*



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FENDT 900 Vario COM III - EAME
English

## 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!

| | |
|---|---|
| **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

# FENDT 900 Vario - COM III

## Volume 1



## Volume 2



## Volume 3

# FENDT 900 Vario - COM III

## Volume 4

# 0000 Overall system/tractor

# A General

# 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).*

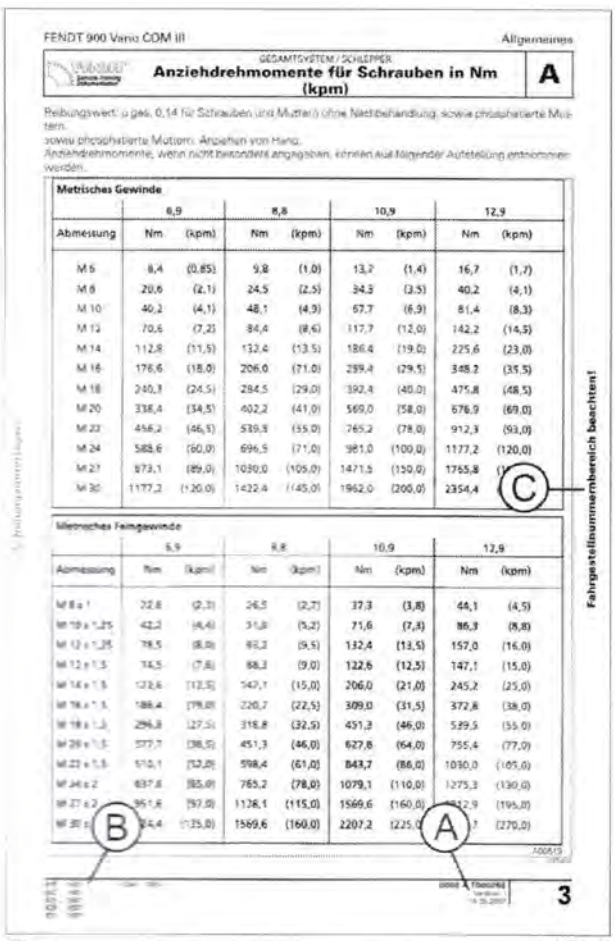


*Fig. 1* I003732

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

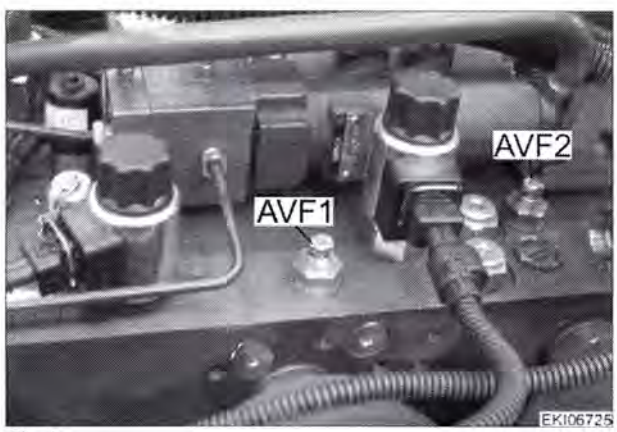

*Fig. 2.* I005112

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

**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


*Fig. 4. FENDT 900 Vario*

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

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 |
|---|---|---|---|---|---|---|
| **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 | | | | | |

| 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 | | | | | |

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 |
|---|---|---|---|---|---|---|
| Clutch (4V5 pressure-limiting valve)<br>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)**<br>"1000" (1000 rpm)/"540" (540 rpm) (optional) or<br>"1000" (1000 rpm)/"1000E" (1400 rpm) (optional) | | | | | |
| Differential lock<br>(Rear diff. lock/front diff. lock) | Wet multiple-disc lock/electro-hydraulically actuated/<br>selectable under load<br><br>**Auto:**<br>The differential lock disengages automatically at speeds higher than 20 km/h and must be re-selected below 20 km/h<br><br>The differential lock automatically disengages when the steering angle is greater than 15° and re-engages below 15°<br>The differential lock also disengages when the foot brake is depressed and re-engages when the foot brake is released<br><br>**100% diff. lock** | | | | | |



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 |
|---|---|---|---|---|---|---|
| 4WD clutch | Wet multiple-disc clutch/electro-hydraulically actuated/ selectable under load<br>**Auto:**<br>4WD automatically disengages at speeds higher than 20 km/h and re-engages at speeds below 20 km/h<br>4WD is automatically disengaged when the steering angle is greater than 25°, and re-engages below 25°<br>**100% 4WD clutch** | | | | | |
| **Axle point**<br>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)**<br><br>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)**<br>(Note: With this version, the tractor is decelerated via the rear wheel brake and by engaging 4WD)<br><br>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**<br>Variant: 2-circuit brake with/without front PTO | Forced feed lubrication<br>Hydraulic pump: 16cc/r with 25 bar at pressure-limiting valve<br>Drive transmission: 0.896<br><br>Hydraulic pump delivery rate:<br>17 l/min (at an engine speed of 1000 rpm)<br>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<br>Hydraulic pump: 8cc/r with 25 bar at pressure-limiting valve<br>Drive transmission: 0.896<br>Hydraulic pump delivery rate:<br>9 l/min (at an engine speed of 1000 rpm)<br>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<br>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);<br><br>Drive via 4WD shaft<br>Pumping in forwards direction<br>Short-circuit to tank on reversing | 36 l/min (at 60 km/h)/pressure: max. 190 bar<br>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,<br>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)<br>Auxiliary control valve 1.2 "blue" (standard)<br>Auxiliary control valve 1.3 "red" (standard)<br>Auxiliary control valve 1.4 "green" (standard)<br>Auxiliary control valve 1.5 "brown" (optional)<br>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)<br>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)<br><br>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.<br>(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)<br>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<br>Version 2: Fendt super deluxe seat, Maximo Evolution (MSG 97 AL/741)<br>– Active seat air conditioning for seat cooling or heating to ensure comfortable seat climate<br>– Active weight adjustment for fully-automatic setting and adjustment of driver weight<br>Version 3: Fendt super deluxe seat, Maximo Evolution active (MSG 97 EAC/741)<br>– Active seat air conditioning for seat cooling or heating to ensure comfortable seat climate<br>– Active weight adjustment for fully-automatic setting and adjustment of driver weight<br>– Active suspension | | | | | |
| | | | | | | |
| **Technical specification extract: electrics/electronics** | | | | | | |



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

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

# 9 Position of sign plates

## Position of sign plates

### Vehicle sign plate

right side, on front axle casing

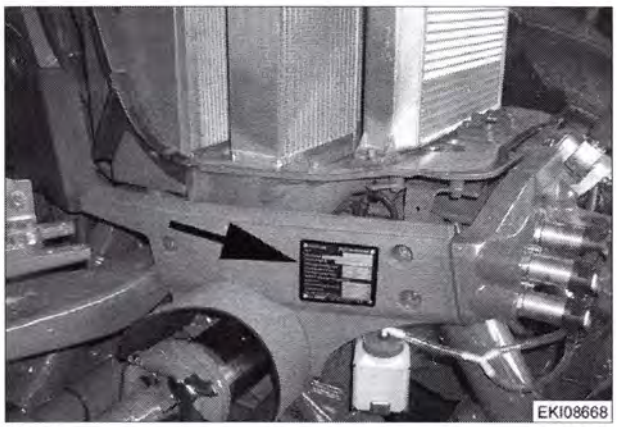



*Fig. 5.* I002592

### Chassis number (engraved)

right side, on front axle casing

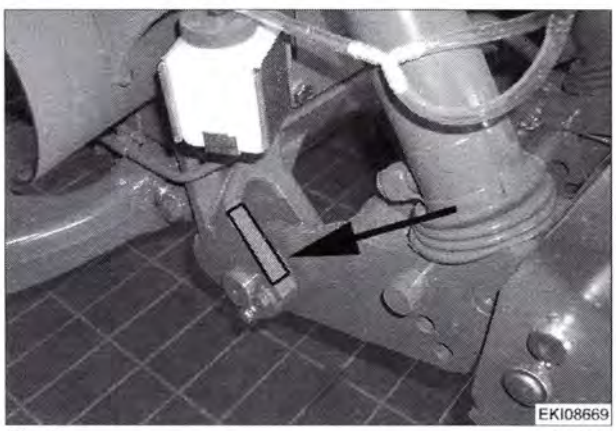



*Fig. 6.* I002593

### Front axle sign plate

right side, on front axle casing

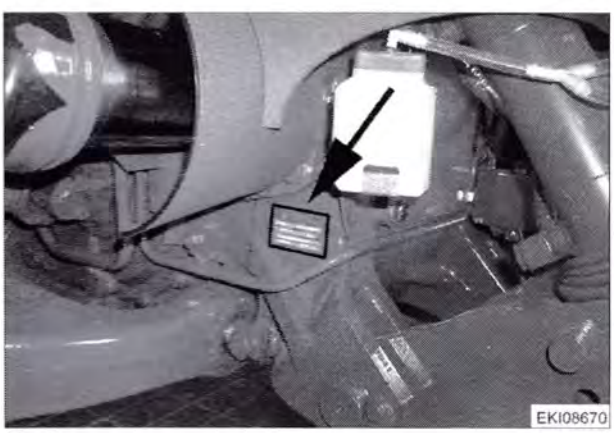
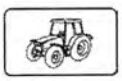



*Fig. 7.* I002594

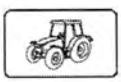
**Diesel engine sign plate**



right side, on crankcase


*Fig. 8.* I002591

**Transmission sign plate**



right side on transmission housing

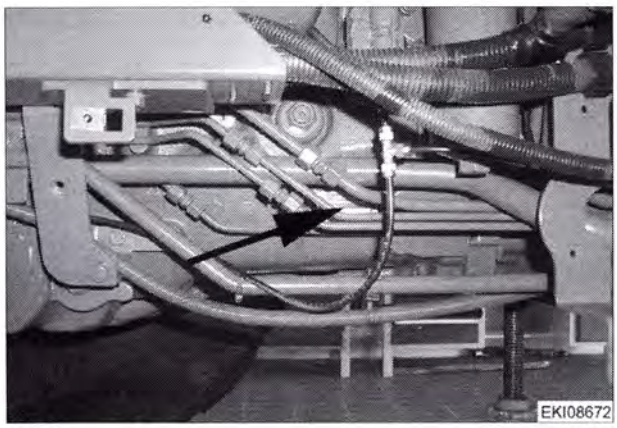
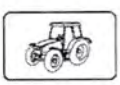
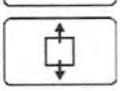



*Fig. 9.* I002596

**Vario transmission insert sign plate**



on top of Vario transmission insert



Remove cab, remove transmission cover

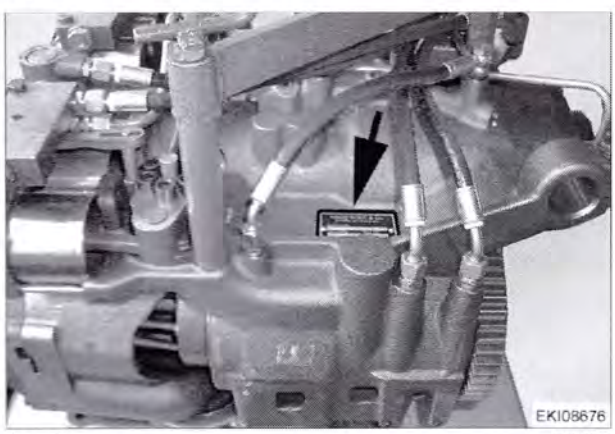
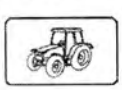



*Fig. 10.* I002600

**Rear axle sign plate**



right side, on rear axle housing

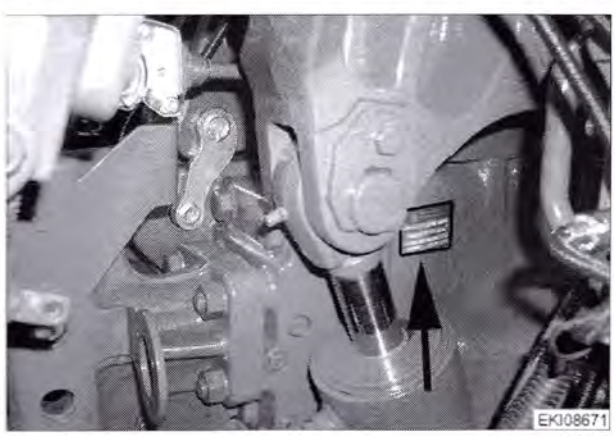



*Fig. 11.* I002595

**Cab sign plate**

in rear of cab

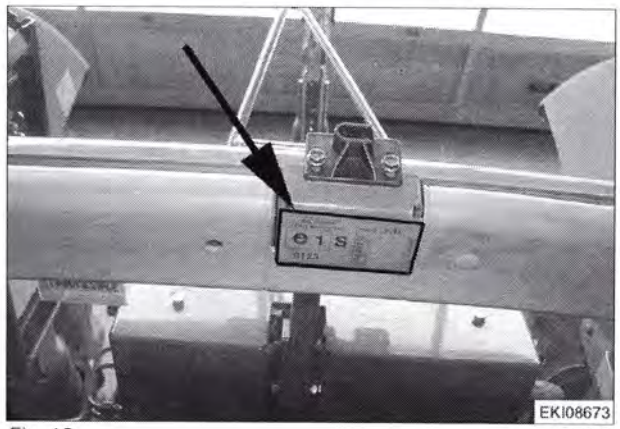
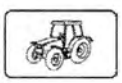



*Fig. 12.* I002597

**Trailer frame sign plate**

**NOTE:** *See also: Operating manual*



right side, on trailer frame

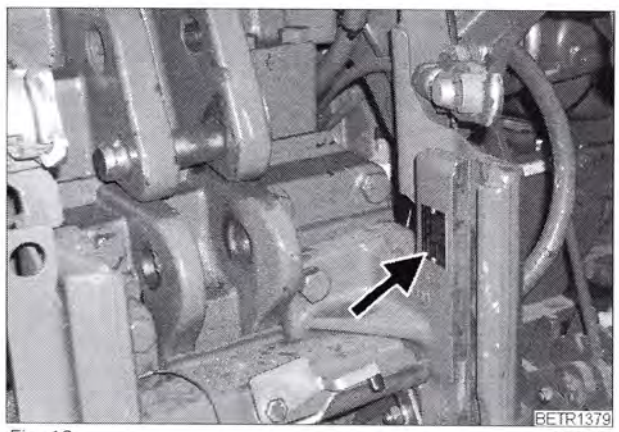
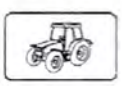



*Fig. 13.* I002604

**Automatic trailer hitch sign plate**

**NOTE:** *See also: Operating manual*



on trailer hitch

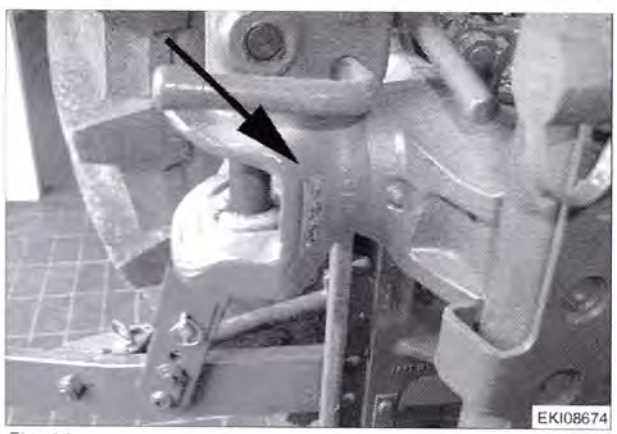



*Fig. 14.* I002598

**Ball-type coupling (height adjustable) sign plate**

**NOTE:** *See also: Operating manual*

on ball-type coupling

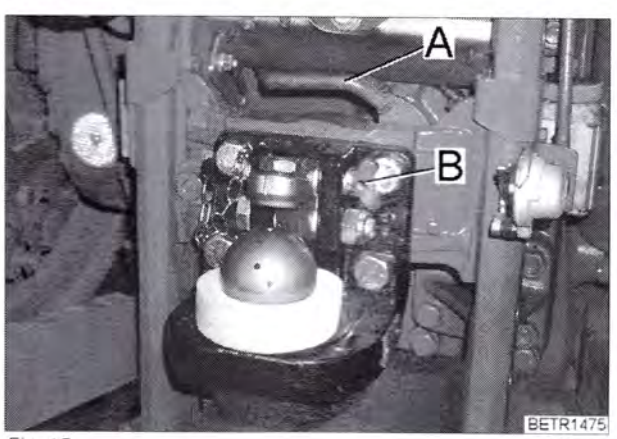



*Fig. 15.* I002601

### Ball-type coupling sign plate

**NOTE:** *See also: Operating manual*

on ball-type coupling

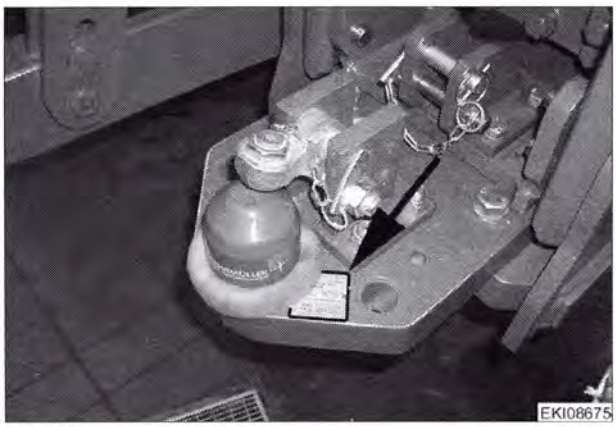



*Fig. 16.* I002599

### Draw bar sign plate

**NOTE:** *See also: Operating manual*

on draw bar

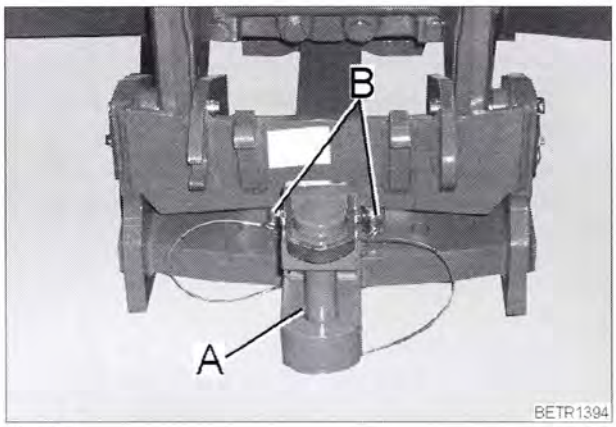



*Fig. 17.* I002602

### Piton Fix sign plate

**NOTE:** *See also: Operating manual*

on Piton Fix

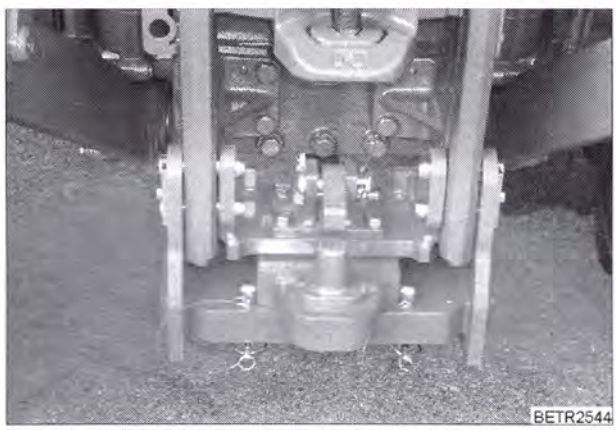



*Fig. 18.* I002603

### Hydraulic hitch sign plate

**NOTE:** *See also: Operating manual*

on hydraulic hitch

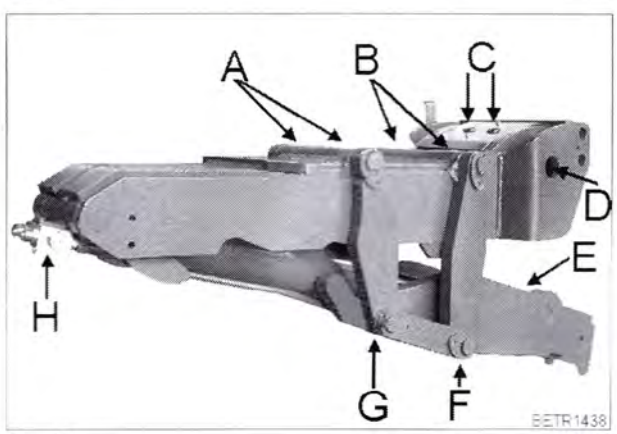



*Fig. 19.* I002605



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-

## 10 Tractor diagnostics with terminal

Ignition on

Press F6.

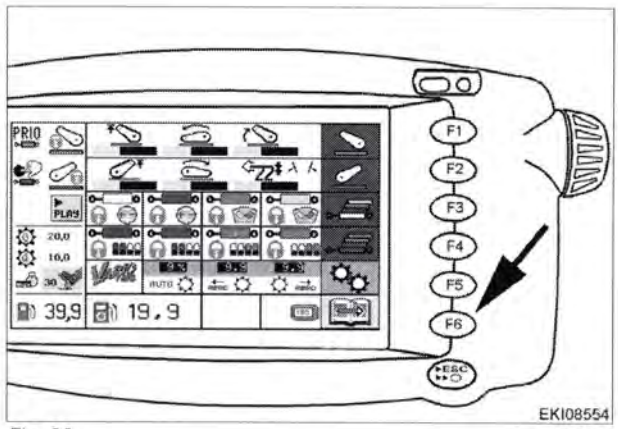



*Fig. 20.* I002368

The second menu level is displayed.

Press F6.

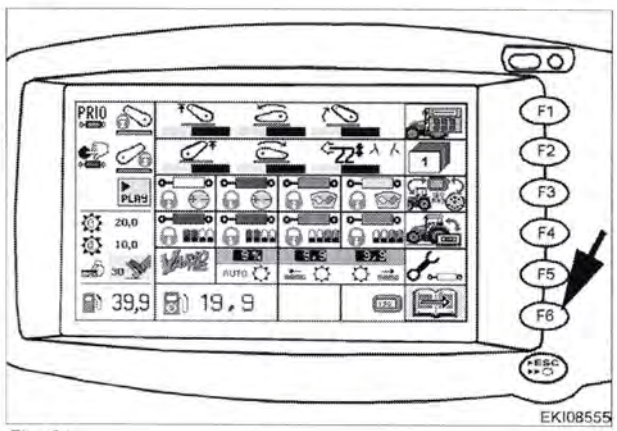



*Fig. 21.* I002369

The third menu level is displayed.

Press F5.

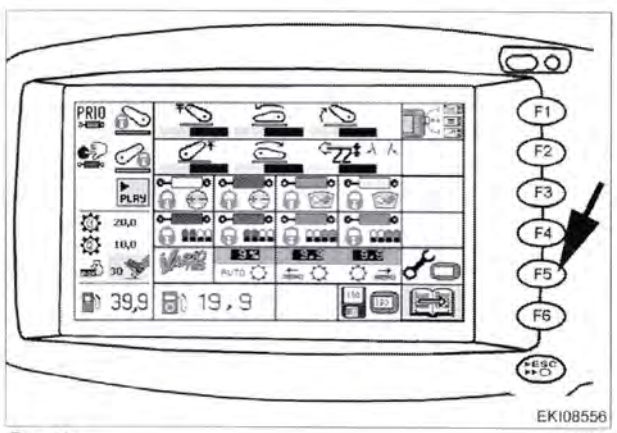



*Fig. 22.* I002370

The diagnostics menu is displayed.

Press F2.

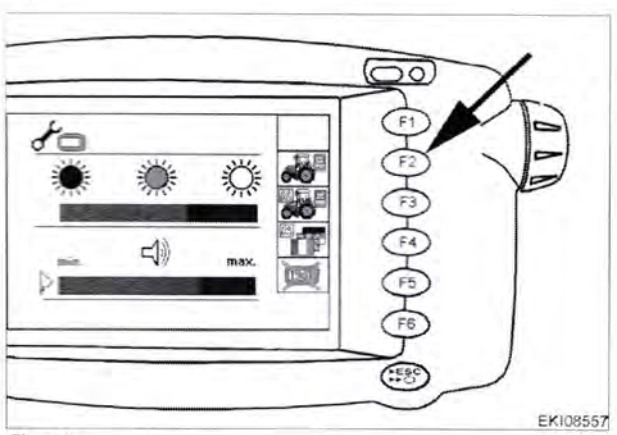



*Fig. 23.* I002371

**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.

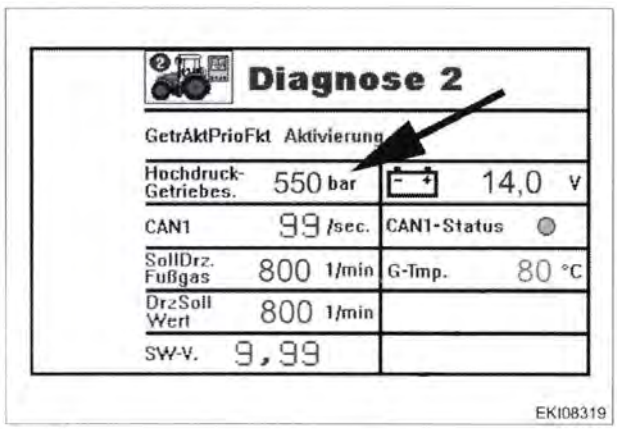



*Fig. 25.* I001537

**Legend:**

- **High-pressure transmission** sensor B008, displays oil pressure in the transmission high pressure circuit
- **Getr**iebe -**Akt**ion -**Prio**rität -**Fun**k**t**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)
- **Softw**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