Workshop Service Manual

FENDT 900 Vario SCR (Stage 3b)

941 .. 1001-
942 .. 1001-
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945 .. 1001-
946 .. 1001-

AGCO GmbH - Johann-Georg-Fendt-Str. 4 D-87616 Marktoberdorf
FENDT is a worldwide brand of AGCO

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English

TABLE OF CONTENTS

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
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 A, §1, page 7

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).

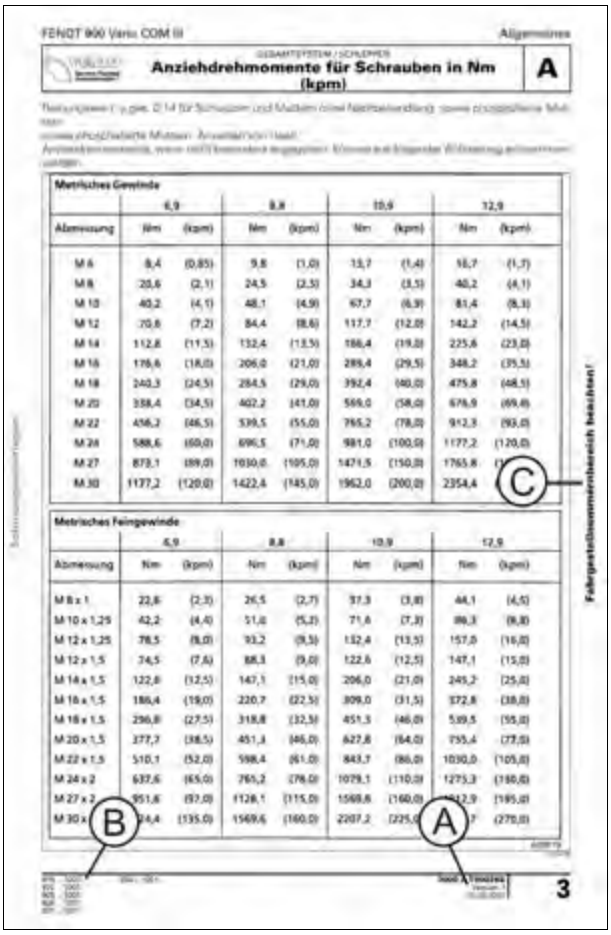


Fig. 1. I003732

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 assemblies 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.
Operation, maintenance and repair of the tractor may only be carried out by people who are familiar with this equipment and aware of the associated dangers. Ensure that this documentation is available to and understood by everyone involved in operation, maintenance and repair. Not observing this documentation can lead to faults, 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 machine 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.
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 repairs

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. to the front loader.
- All people should keep clear of a lifted, unsecured load (e.g. tilted 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 pipes are highly pressurised. Only remove and repair in accordance with instructions provided 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 welding appliance's earth terminal 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 cased ASPL, ASPR and ZSP pressure accumulators***

are under 200 bar (2900,80 lbf/in² (PSI)) 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 ***Y064*** *- Suspension load pressure & lowering solenoid valve and* ***Y065*** *- Suspension raise solenoid valve has no effect!*
(There are hydraulic pilot-operated non-return valves built in)

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

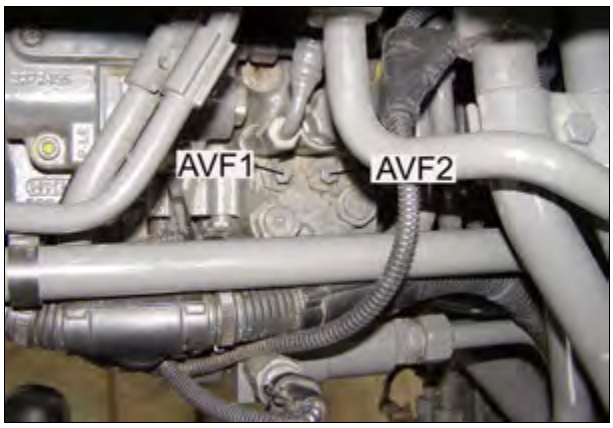


Fig. 2. I000803

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

3. Working on the brake system

DANGER:
The brake system compressed air lines remain under pressure even when the engine has been switched off!

Safety measures:
Before each repair to the brake system or when removing the cab, the pressure must be relieved manually.

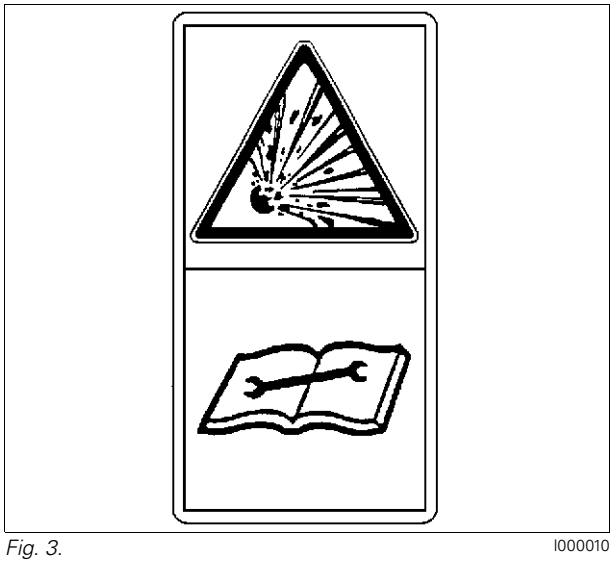


Fig. 3. I000010

To release pressure:

1. Engine must be off.
2. Make sure the tractor is secured to prevent it rolling.
3. Release the air using the drainage valve on circuit 1.
4. Actuate the foot and hand brakes until no air noise can be heard.

General notes:

– 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)!

4. Working on the engine

- After switching the engine off, 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 pipes and high-pressures lines must not be deformed.
- Any damaged injection pipe or high-pressure line must be replaced.
- Do not loosen any injection pipes 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.

5. 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.
- Make sure drive shaft and PTO are equipped with shield pipes and protective funnels.
- After deactivating the PTO, it is possible that parts on the mounted implement may continue to run. In this case, do not get too close to the implement. Work may only be carried out to the implement when nothing is moving!
- When the drive shaft is removed, cover the PTO shaft 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.

6. 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.
- In the event of a collapsed pipe rupture feature, support the load before starting repair work, and slowly retract the cylinder.
- Check hydraulic hoses and pipes for signs of damage and aging regularly 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.

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 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 (59,00 °F).
Vegetable-based hydraulic oil may thicken in outside temperatures below approx. -15 °C (59,00 °F) 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.*

6 Tightening torques for bolts in Nm (kpm)

Choose the correct friction coefficient

To ensure that the tightening torque and preload value can be accurately determined, it is essential to know the **friction coefficient (μ_{total})**. Varying surface properties and lubrication conditions give rise to a wide range of friction coefficients. If not otherwise specified, tightening torques can be calculated based on their friction coefficient using the table below.

NOTE: *Locking screws with retaining ridges on the screw head contact surface have a greater friction coefficient.*

Tightening torques in relation to the friction coefficient

Metric thread with a friction coefficient of μ_{total} = 0.14								
	6.9		8.8		10.9		12.9	
Size	Nm	(kpm)	Nm	(kpm)	Nm	(kpm)	Nm	(kpm)
M6	8.4	0.85	9.8	1	13.7	1.4	16.7	1.7
M8	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	142.2	14.5
M 14	112.8	11.5	132.4	13.5	186.4	19	225.6	23
M 16	176.6	18	206	21	289.4	29.5	348.2	35.5
M 18	240.3	24.5	284.5	29	392.4	40	475.8	48.5
M20	338.4	34.5	402.2	41	569	58	676.9	69
M 22	456.2	46.5	539.5	55	765.2	78	912.3	93
M24	588.6	60	696.5	71	981	100	1177.2	120
M27	873.1	89	1030	105	1471.5	150	1765.8	180
M30	1177.2	120	1422.4	145	1962	200	2354.4	240

Metric fine thread with a friction coefficient of μ_{total} = 0.14								
	6.9		8.8		10.9		12.9	
Size	Nm	(kpm)	Nm	(kpm)	Nm	(kpm)	Nm	(kpm)
M8x1	22.6	2.3	26.5	2.7	37.3	3.8	44.1	4.5
M10x1.25	42.2	4.4	51	5.2	71.6	7.3	86.3	8.8
M12x1.25	78.5	8	93.2	9.5	132.4	13.5	157	16
M12x1.5	74.5	7.6	88.3	9	122.6	12.5	147.1	15
M14x1.5	122.6	12.5	147.1	15	206	21	245.2	25
M16x1.5	186.4	19	220.7	22.5	309	31.5	372.8	38
M18x1.5	296.8	27.5	318.8	32.5	451.3	46	539.5	55
M20x1.5	377.7	38.5	451.3	46	627.8	64	755.4	77
M22x1.5	510.1	52	598.4	61	843.7	86	1030	105
M24x2	637.6	65	765.2	78	1079.1	110	1275.3	130
M27x2	951.6	97	1128.1	115	1569.6	160	1912.9	195
M30x2	1324.4	135	1569.6	160	2207.2	225	2648.7	270

7 Position of sign plates

Position of sign plates

Vehicle sign plate

right side, on front axle casing

Fig. 4. I002592

Chassis number (engraved)

right side, on front axle casing

Fig. 5. I002593

Front axle sign plate

right side, on front axle casing

Fig. 6. I002594

Diesel engine sign plate

right side, on crankcase

Fig. 7. I002591

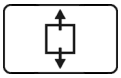
Transmission sign plate

right side on transmission housing

Fig. 8. I002596

Vario transmission insert sign plate

on top of Vario transmission insert



Remove cab, remove transmission cover

Fig. 9. I002600

Rear axle sign plate

right side, on rear axle housing

Fig. 10. I002595

Cab sign plate

in rear of cab

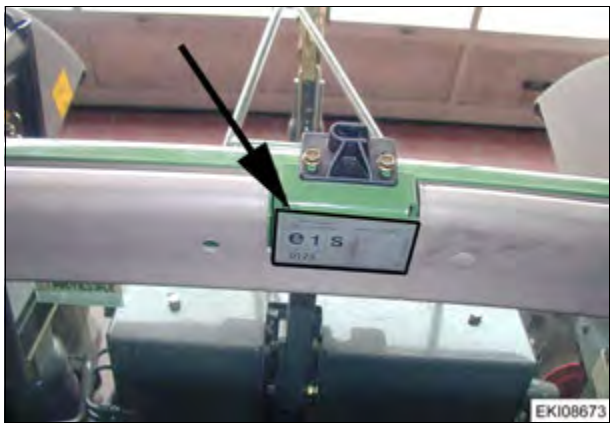


Fig. 11. I002597

Trailer frame sign plate

NOTE: *See also: Operating manual*

right side, on trailer frame

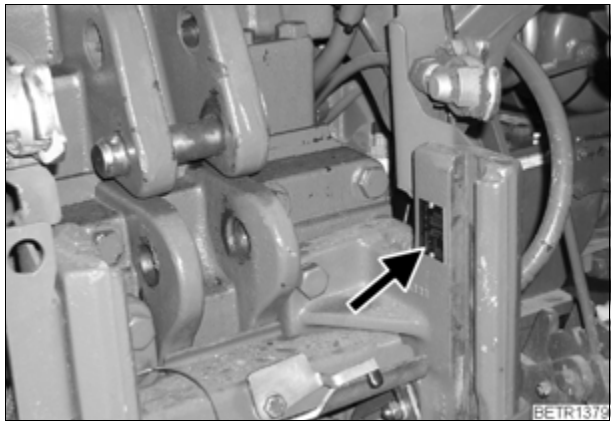


Fig. 12. I002604

Automatic trailer hitch sign plate

NOTE: *See also: Operating manual*

on trailer hitch

Fig. 13. I002598

Ball-type coupling (height adjustable) sign plate

NOTE: *See also: Operating manual*

on ball-type coupling

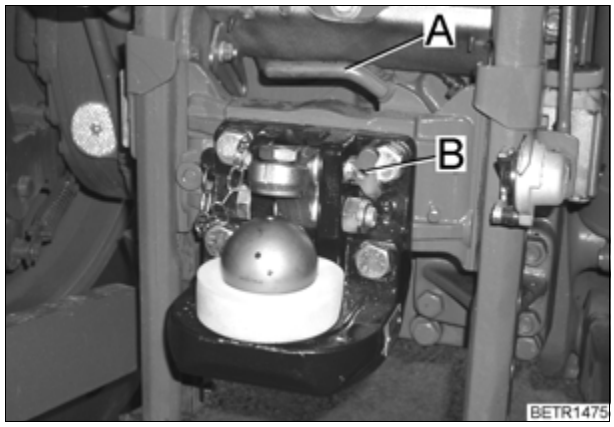


Fig. 14. I002601

Ball-type coupling sign plate

NOTE: *See also: Operating manual*

on ball-type coupling

Fig. 15. I002599

Draw bar sign plate

NOTE: *See also: Operating manual*

on draw bar

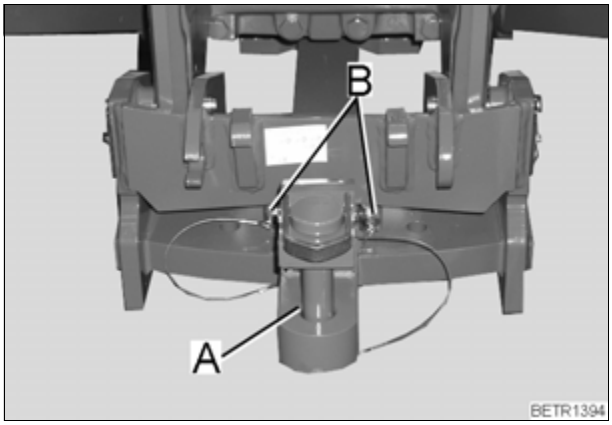


Fig. 16. I002602

Piton Fix sign plate

NOTE: *See also: Operating manual*

on Piton Fix

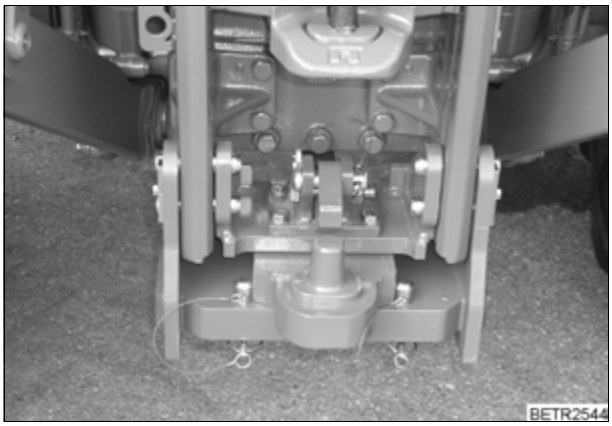


Fig. 17. I002603

Hydraulic hitch sign plate

NOTE: *See also: Operating manual*

on hydraulic hitch

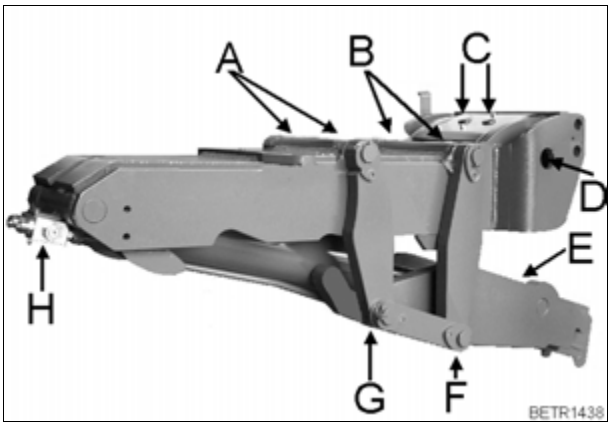


Fig. 18. I002605

8 "FENDT 900" tractor diagnostics — End-of-line version, Vario transmission, hydraulic valves, VarioGuide, VarioDoc) with A103 10.4" and 7" terminal

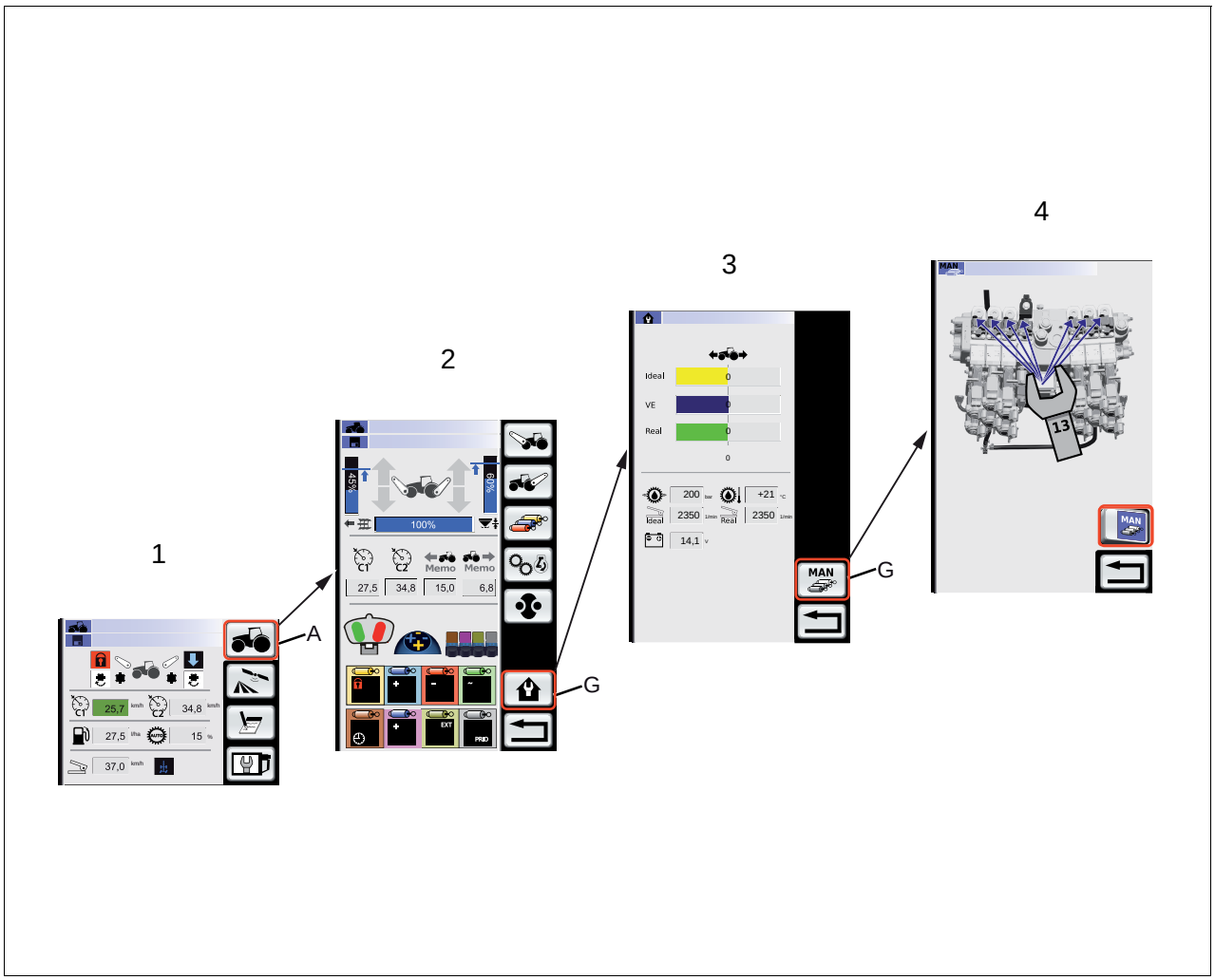


Fig. 19. I017598

(1) Tractor info
(2) Tractor main page
(3) Maintenance diagnostics
(4) Diagnostics
(5) Manual operation of the auxiliary spool valves

Reading the end-of-line version (from autumn 2011)

D = EOL: End-of-line

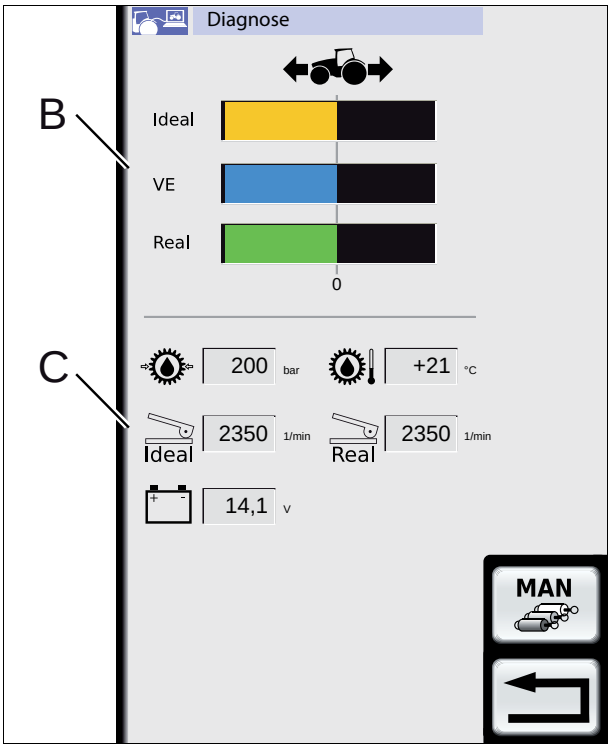


Fig. 20. I018767

Reading the EOL: end-of-line version (D)	
Diagnostics	**Note**
Software interconnection	End-of-line version
Programmed by	With which FENDT USB adapter the last end-of-line version was installed. The FENDT USB adapter was allocated to the relevant Technical Service workshop
on	Date of last end-of-line programming

Transmission diagnostics

B=Transmission ratio display
C=Transmission sensors display

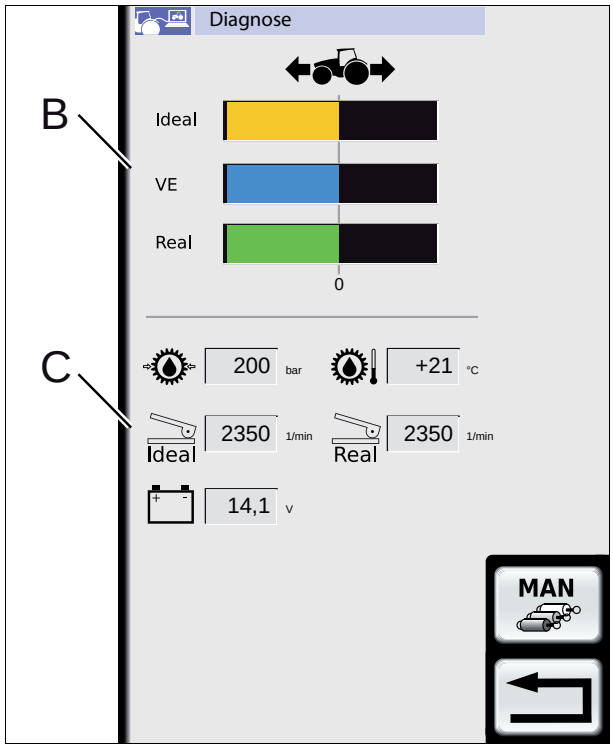


Fig. 21. I018767

Diagnostics of the transmission ratio (B)		
Diagnostics	**Sensor/actuator**	**Value**
Ideal	Ratio setting by the A050 basic control unit	0 Standstill - approx. 10,000 (max. reverse ratio) + approx. 10,000 (max. forward ratio)
VE	Adjustment angle of the A009 actuator unit	
Real	The actual ratio in the transmission B010 engine speed sensor B015 bevel pinion sensor	

Diagnostics of the transmission sensors (C)		
Diagnostics	**Sensor**	**Value**
Transmission high pressure	B008 high-pressure sensor 1	bar
Transmission oil temperature	B009 discharge temperature sensor	°C

Diagnostics of the transmission sensors (C)		
Diagnostics	**Sensor**	**Value**
Ideal	Engine speed Target value set by B055 foot throttle sensor	rpm
Real	Engine speed Target value set by A050 basic control ECU - B055 foot throttle sensor - B035 hand throttle sensor - TMS	rpm
Battery voltage	G001 battery	VDC

Manual emergency actuation of the auxiliary control valves

G = switch on manual operation of the auxiliary control valves.

The auxiliary control valves can now be operated in manual mode without fault messages.

NOTE: *Only possible if the hand brake is applied*

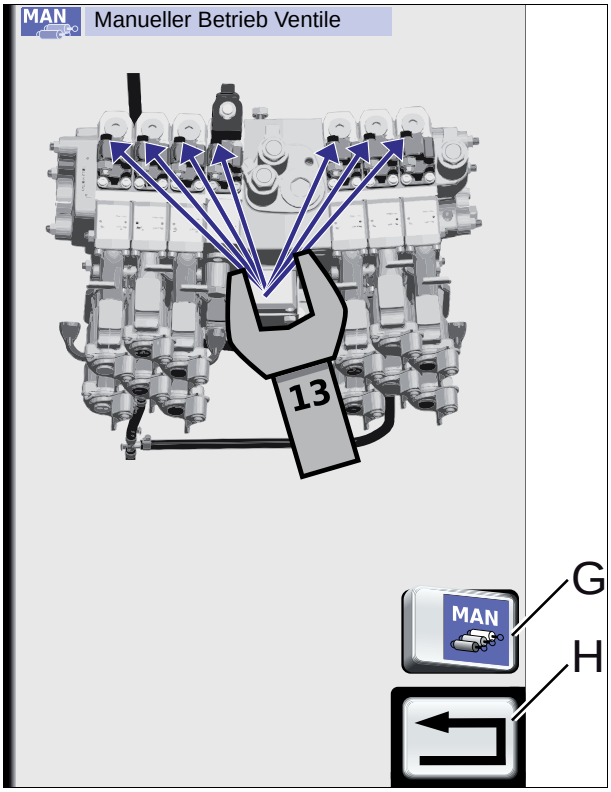


Fig. 22. I017599

Rear of tractor:
- Auxiliary spool valves
- Rear power lift

– Actuate the various operating modes (raise — neutral — lower — floating position) by turning the rear actuating screws (A)
NOTE: *Without a cab here for improved visibility*

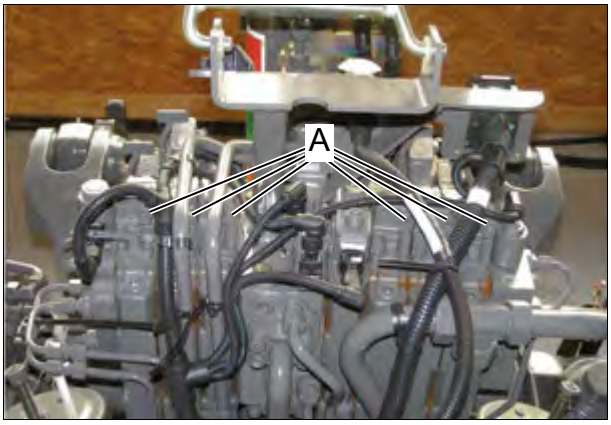


Fig. 23. I027318

Front of tractor:
- Auxiliary spool valves
– Front power lift

Position of the hydraulic valves at the right-hand entry steps

– Actuate the various operating modes (raise - neutral - lower - floating position) by turning the rear actuating screw (B)

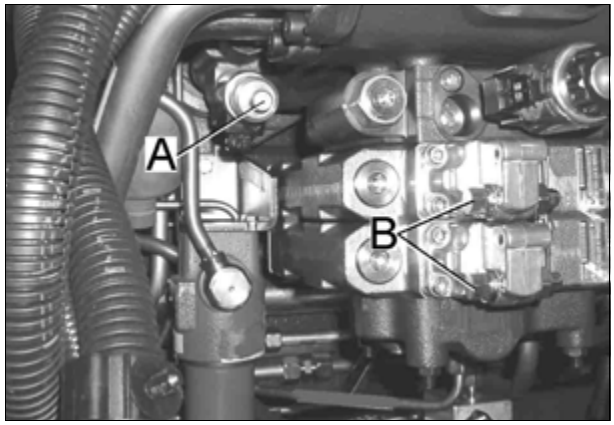


Fig. 24. I013319

NOTE: *In the event of EHS valve electronic failure, the* ***single-acting standard front power lift*** *can be lowered by turning the bolt (A).*


Fig. 25. I027313

– **If the engine fails**, generate pilot pressure with pump (HP) and simultaneously actuate the required valve in manual mode.

Fig. 26. I025240

– Close the pilot valve (B) by turning.

During manual operation, this image appears on the multiple display.

NOTE: *After operating in emergency mode, reopen the pilot valve (A).*

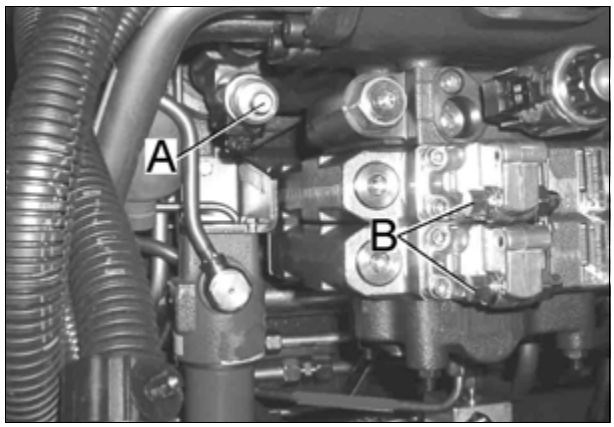


Fig. 27. I013319

Check the VarioGuide system (automatic track guidance)

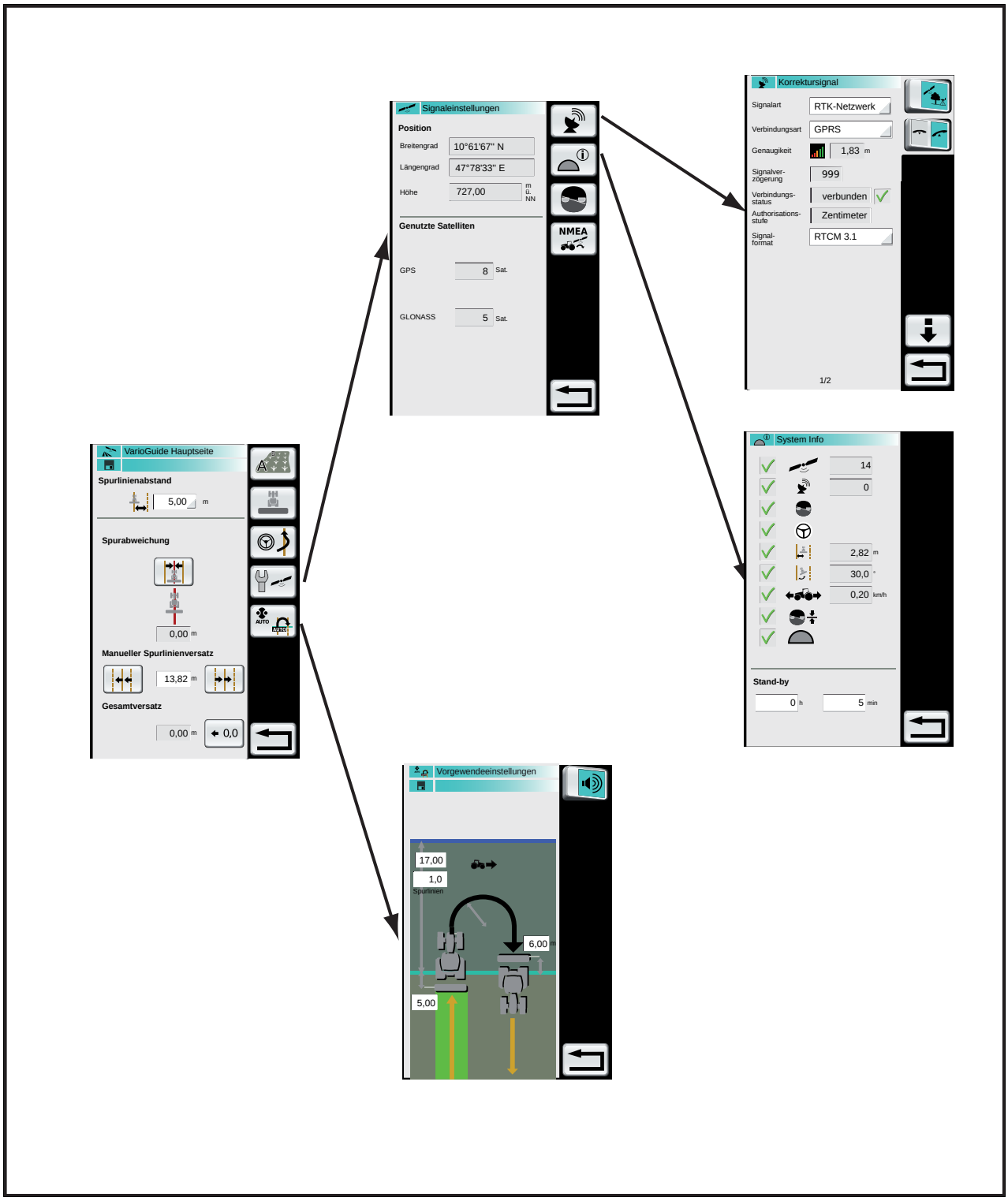


Fig. 28. VarioGuide menu tree I023655

A **GNSS position:** The green tick will appear whenever a valid GNSS position has been successfully determined from the GNSS data and the correction signal data. The number of GNSS satellites is also displayed.

B **Correction signal:** The green tick will appear whenever a correction signal can be received. In addition, you will see the time in s taken to receive the correction signal update. If 999 is shown here, the correction signal cannot be currently updated or received.

C **Gyro compass initialisation:** The green tick will appear once initialisation has been successful. Whenever the A102 ECU has been switched on, a short distance at more than 1.5 km/h must be driven to initialise the gyro compass.

D **Steering system:** The green tick will appear whenever the self-test was successful. The EHL is ready for operation and can be pre-activated on the A100 multi-function armrest.

E **Distance to way line:** The distance to the way line must be less than 10 m.

F **Joining angle to wayline:** The wayline joining angle must be less than 75°.

G **Speed:** The speed must be between 0.2 km/h and 25 km/h.

H **Gyro compass calibration:** The green tick will appear whenever the self-test of the gyro compass was successful.

I **VarioGuide GNSS A102 ECU:** The green tick will appear whenever the self-test was successful.

J **Stand-by time:** This feature can be used to specify how long the GNSS receiver remains switched on after the ignition is switched off and thus retains the position data, reception and calibration of the gyro compass.

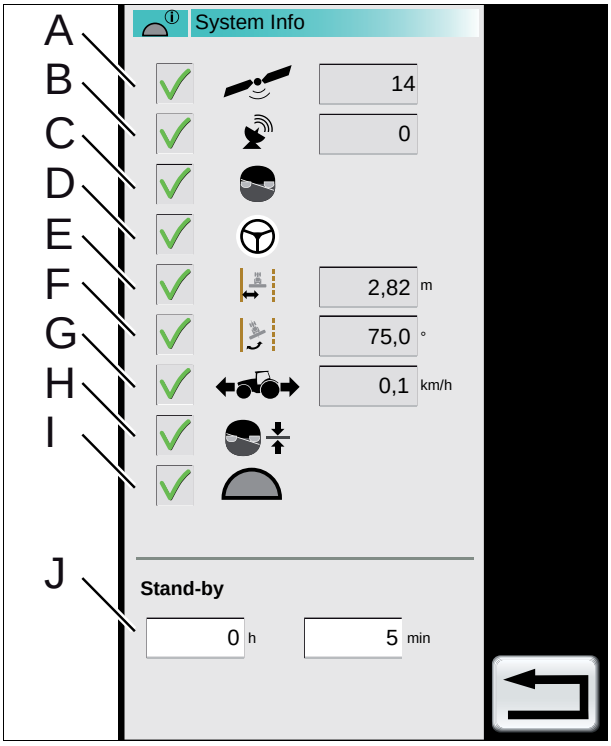


Fig. 29. I023637

VarioDoc Basic/VarioDoc pro — System test

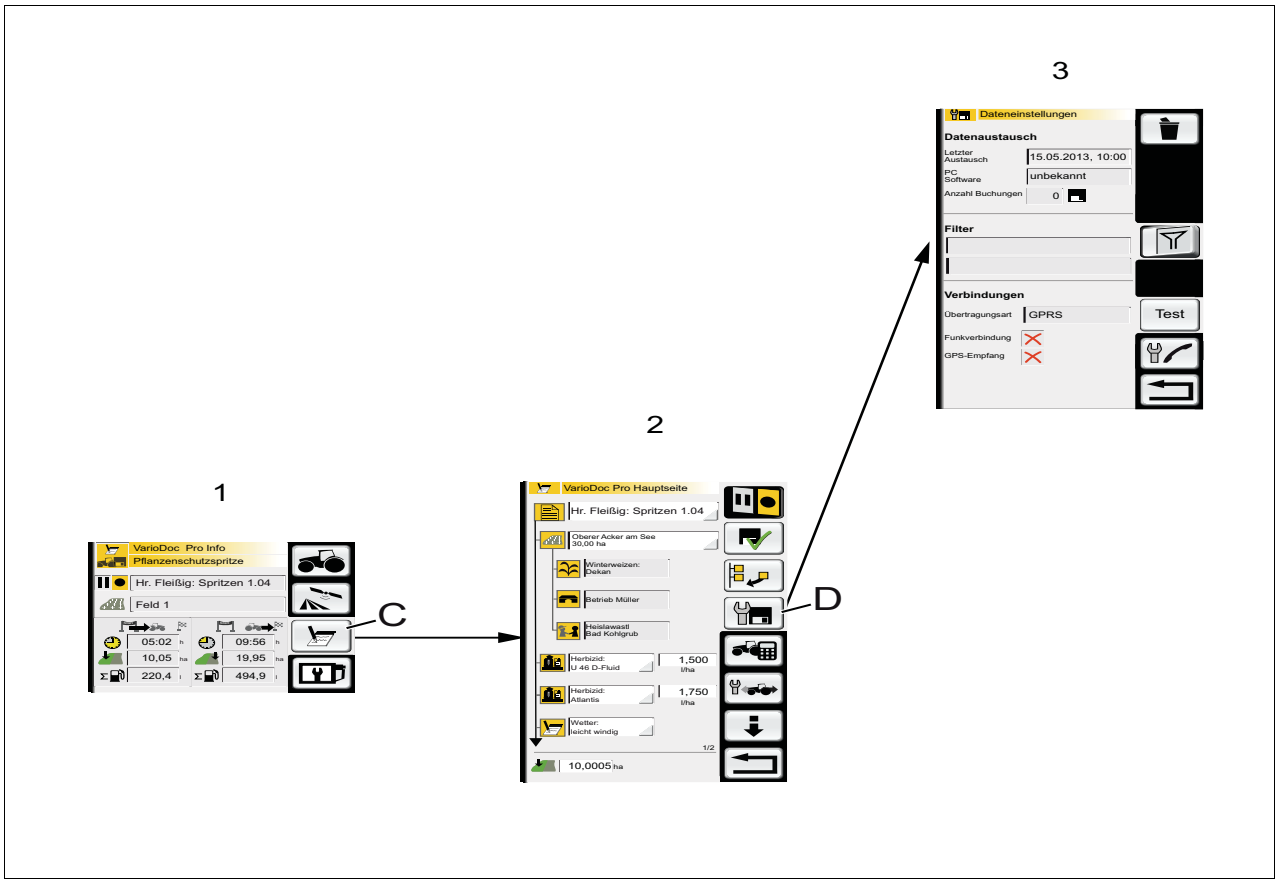


Fig. 30. I025554

Press button (C) to call up "VarioDoc main page".
On the VarioDoc main page, push button D.
The "data settings" page appears

Call up VarioDoc system test with the (F) button

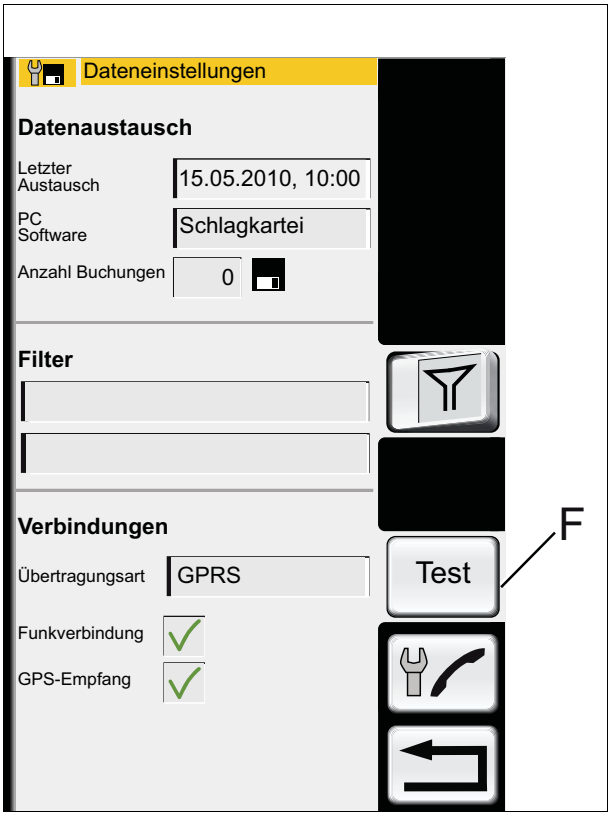


Fig. 31. I025600

The "system test" page is displayed

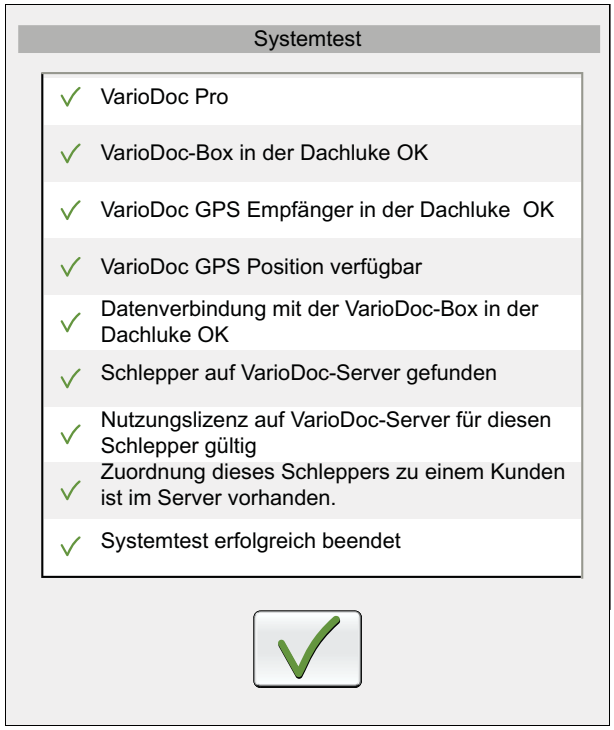


Fig. 32. I025601

System test: VarioDoc Basic

Test no.	Sym-bol	System test report	Description
-1	✓	VarioDoc Basic	VarioDoc is programmed into the A103 terminal (10.4")
+2	✓	ISOBUS main switch in the Variotermi-nal: ON	Switch on the main switch under "Man-agement / ISOBUS information" - See also Tractor Operator's Manual "Operation Section" -
	✗	ISOBUS main switch in the Variotermi-nal: OFF	
-3	✓	VarioDoc ISO BUS task controller in the Varioterminal: ON	Switch on the task controller under "Man-agement / ISO BUS information" - See also Tractor Operator's Manual "Operation Section" -
	✗	VarioDoc ISO BUS task controller in the Varioterminal: OFF	
+4	✓	Office PC radio module recognised	The Bluetooth radio module and the trac-tor must recognise each other (pairing) - See also VarioDoc Operator's Manual -
	✗	Office PC radio module not recognised	

Test no.	Sym-bol	System test report	Description
-5	✓	Connection to office PC established	The tractor is within range of the Blue-tooth connection to the office PC - See also VarioDoc Operator's Manual - Office PC switched off? Radio module plugged into office PC? Office PC out of range? VarioDoc Manager installed on office PC?
	✗	No connection to office PC...	
+6	✓	System test successfully completed.	Correct system fault
	✗	System test completed. Faults have occurred!	

System test: VarioDoc pro

Test no.	Sym-bol	System test report	Description
-1	✓	VarioDoc Pro	VarioDoc is programmed into the A103 terminal (10.4")
+2	✓	ISOBUS main switch in the Variotermi-nal: ON	Switch on the main switch under "Man-agement / ISOBUS information" - See also Tractor Operator's Manual "Operation Section" -
	✗	ISOBUS main switch in the Variotermi-nal: OFF	
-3	✓	VarioDoc ISO BUS task controller in the Varioterminal: ON	Switch on the task controller under "Man-agement / ISO BUS information" - See also Tractor Operator's Manual "Operation Section" -
	✗	VarioDoc ISO BUS task controller in the Varioterminal: OFF	
+4	✓	VarioDoc Box in the ceiling compartment OK	A101-VarioDoc pro ECU Check wiring set connected to A101-ECU
	✗	VarioDoc Box in the ceiling compartment not found	
-5	✓	VarioDoc GPS receiver in ceiling compart-ment OK	A102-VarioGuide GNSS ECU or U004 GNSS antenna Check wiring set connected to A102-ECU/U004 antenna
	✗	VarioDoc GPS receiver in ceiling compart-ment not found	

Test no.	Sym-bol	System test report	Description
+6	✓	VarioDoc GPS position available	Satellite position signal: - GPS - GLONASS Ensure that the view to the satellites is not blocked Position determination can take up to 15 minutes after long periods stationary!
	✗	VarioDoc GPS position not available	
-7	✓	Data connection to VarioDoc Box in ceiling compartment OK	A101-VarioDoc pro ECU - ISO BUS - Comfort BUS
	✗	Data connection to VarioDoc Box in ceiling compartment faulty	
-8	✓	SIM card found	Insert SIM card into the A101 VarioDoc ECU and activate it on the A103 terminal (10.4") If there is no SIM card, Bluetooth radio transmission to the office PC can be used! The A101 VarioDoc pro ECU can send data: - Via Bluetooth radio connection to the office PC - Via mobile radio SIM card to the FENDT server - See also VarioDoc Operator's Manual -
	✗	No SIM card found	
-9	✓	SIM card PIN OK	Enter SIM card PIN - Enter correct PIN or PUK - See also VarioDoc Operator's Manual -
	✗	SIM card PIN incorrect	
10	✓	GPRS / EGPRS data connection to VarioDoc Server OK	GPRS (General Packet Radio Service) - Packet-orientated service for transmission of data across a **mobile communications network** (GSM or UMTS) EGPRS (Enhanced General Packet Radio Service) - Enhanced packet-orientated service for transmission of data across a **mobile communications network**: GSM or UMTS No mobile communications network available Access data incomplete or incorrect Data tariff entered for this SIM card?
	✗	GPRS / EGPRS data connection to VarioDoc Server not possible	

Test no.	Sym-bol	System test report	Description
11	✓	VarioDoc Server found	**A101 VarioDoc ECU** <--> **GSM — mobile communications network** <--> **mobile radio provider "Provider"** <--> **Internet (LAN)** <--> **FENDT VarioDoc Server** <--> Internet (LAN) <--> office PC Wait until FENDT VarioDoc Server is available again
	✗	VarioDoc Server not available!	
12	✓	Vehicle found on VarioDoc Server	Register the vehicle on the FENDT VarioDoc Server using the chassis number AGCOnet: FENDT/Parts Marketing/Documents/Forms See also: Create/delete VarioDoc pro account on the VarioDoc pro Server
	✗	Vehicle not recognised on VarioDoc Server	
13	✓	User licence for tractor valid	Extend user licence on FENDT VarioDoc Server AGCOnet: FENDT/Parts Marketing/Documents/Forms See also: Create/delete VarioDoc pro account on the VarioDoc pro Server Alternatively, remove the SIM card and use Bluetooth connection to the office PC
	✗	User licence for tractor expired	
14	✓	This vehicle is allocated to a customer in the VarioDoc Server	Register the vehicle on the FENDT VarioDoc Server using the chassis number AGCOnet: FENDT/Parts Marketing/Documents/Forms See also: Create/delete VarioDoc pro account on the VarioDoc pro Server
	✗	This vehicle is not allocated to a customer in the VarioDoc Server	
15	✓	System test successfully completed.	Correct system fault
	✗	System test completed. Faults have occurred!	

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

Technical data

1 Technical data: General

Technical data: Dimensions and weights						
Tractor type	**924**	**927**	**930**	**933**	**936**	**939**
Weights						
Unladen weight, full tank	10700 kg (23589 lb)	10760 kg (23721 lb)	10760 kg (23721 lb)	10760 kg (23721 lb)	10830 kg (23876 lb)	10830 kg (23876 lb)
Permissible total weight, with single-circuit brake system and max. 40 km/h (25 mile/h)	18000 kg (39683 lb)					
Permissible total weight, with single-circuit brake system and max. 50 km/h (31 mile/h)	15000 kg (33069 lb)					
Permissible total weight with dual-circuit brake system and 40 km/h (25 mile/h), 50 km/h (31 mile/h)	18000 kg (39683 lb)					
Permissible overall weight with dual-circuit brake system and max. 60 km/h (37 mile/h)	16000 kg (35274 lb)					
Max. permissible front axle load at 40 km/h (25 mile/h)	8000 kg (17637 lb)					
Max. permissible rear axle load	10500 kg (23148 lb)					
Max. permissible vertical load on trailer hitch (in slide rail)	2000 kg (4409 lb)					
Dimensions						
Front tyres	540/65 R34	600/65 R34	600/65 R34	600/65 R34	600/70 R34	600/70 R34
Rear tyres	650/65 R42	650/85 R38	650/85 R38	710/70 R42	710/75 R42	710/75 R42
Overall length	5655 mm (222.8 in)					
Overall width:	2750 mm (108.4 in)					
Overall height with cab	3322 mm (130.9 in)					
Front/rear ground clearance 600/70 R34/710/75 R42	568 mm (22.4 in)/575 mm (22.7 in)					
Front/rear ground clearance 540/65 R34/650/65 R42	478 mm (18.8 in)/488 mm (19.2 in)					
Wheelbase	3050 mm (120.2 in)					
Turning radius without steering brake:						
- 600/70R34 track 2100	13,15 m (43 ft)					
- 600/65R34 track 2100	12,90 m (42 ft)					
- 540/65R34 track 2100	12,15 m (40 ft)					
Front axle flange width	1966 mm (77.5 in)					
Rear axle flange width	1890 mm (74.5 in)					
Standard track front	2100 mm (82.7 in)					
Standard track rear	2050 mm (80.8 in)					
Bolt pitch-circle diameter (front)	425 mm (16.7 in)					
Bolt pitch-circle diameter (rear)	335 mm (13.2 in)					
Rear axle ratio	32,967 l (8.7 gal (US))					
Front axle ratio	16,968 l (4.5 gal (US))					

Technical data: Dimensions and weights						
Tractor type	**924**	**927**	**930**	**933**	**936**	**939**
Tightening torques						
Wheel nuts (front)	450 Nm (332 lbf ft)					
Wheel nuts (rear)	620 Nm (457 lbf ft)					

Technische Daten: Abmessungen und Gewichte					
Schlepper - Typ	**924**	**927**	**930**	**933**	**936**
Gewichte					
Leergewicht, Tank voll	10700 kg (23589 lb)	10760 kg (23721 lb)	10760 kg (23721 lb)	10760 kg (23721 lb)	10830 kg (23876 lb)
zulässiges Gesamtgewicht bei 1-Kreis-Bremse und max. 40 km/h (25 mile/h)	18000 kg (39683 lb)				
zulässiges Gesamtgewicht bei 1-Kreis-Bremse und max. 50 km/h (31 mile/h)	15000 kg (33069 lb)				
zulässiges Gesamtgewicht bei 2-Kreis-Bremse und 40 km/h (25 mile/h), 50 km/h (31 mile/h)	18000 kg (39683 lb)				
zulässiges Gesamtgewicht bei 2-Kreis-Bremse und max. 60 km/h (37 mile/h)	16000 kg (35274 lb)				
zulässige Achslast vorne max. bei 40 km/h (25 mile/h)	8000 kg (17637 lb)				
zulässige Achslast hinten max.	10500 kg (23148 lb)				
zulässige Stützlast Anhängekupplung (in Gleitschiene)	2000 kg (4409 lb)				
Abmessungen					
Bereifung vorne	540/65 R34	600/65 R34	600/65 R34	600/65 R34	600/70 R34
Bereifung hinten	650/65 R42	650/85 R38	650/85 R38	710/70 R42	710/75 R42
Gesamtlänge	5655 mm (222.8 in)				
Gesamtbreite:	2750 mm (108.4 in)				
Gesamthöhe Fahrerkabine	3322 mm (130.9 in)				
Bodenfreiheit vorne / hinten 600/70 R34 / 710/75 R42	568 mm (22.4 in) / 575 mm (22.7 in)				
Bodenfreiheit vorne / hinten 540/65 R34 / 650/65 R42	478 mm (18.8 in) / 488 mm (19.2 in)				
Radstand	3050 mm (120.2 in)				
Spurkreisradius ohne Lenkbremse:					
- 600/70R34 Spur 2100	13,15 m (43 ft)				
- 600/65R34 Spur 2100	12,90 m (42 ft)				
- 540/65R34 Spur 2100	12,15 m (40 ft)				
Flanschmaß Vorderachse	1966 mm (77.5 in)				
Flanschmaß Hinterachse	1890 mm (74.5 in)				
Serienspur vorne	2100 mm (82.7 in)				
Serienspur hinten	2050 mm (80.8 in)				
Lochkreis-Durchmesser (vorne)	425 mm (16.7 in)				
Lochkreis-Durchmesser (hinten)	335 mm (13.2 in)				

Technische Daten: Abmessungen und Gewichte					
Schlepper - Typ	**924**	**927**	**930**	**933**	**936**
Achsübersetzung hinten	32,967 l (8.7 gal (US))				
Achsübersetzung vorne	16,968 l (4.5 gal (US))				
Anzugsmomente					
Radmuttern (vorn)	450 Nm (332 lbf ft)				
Radmuttern (hinten)	620 Nm (457 lbf ft)				

2 Technical data: Gearbox

Specifications apply to Vario 924–Vario 939

Transmission oil	
Oil grade	FENDT Extra Trans 10W-40 or STOU SAE 10W-40 STOU SAE 15W-40 -
Transmission, initial filling approx.	87 l (23.0 gal (US))
Transmission, refilling approx.	67 l (17.7 gal (US))
Oil quantity between min. and max. marks approx.	3 l (0.8 gal (US))

Specifications apply to Vario 924–Vario 939

Vario: continuously variable transmission	
Model	ML 260
Travel range	I (field), II (road)
Speed (forwards)	
Speed range I (Field)	0,02 km/h (0.01 mile/h) to 35 km/h (22 mile/h)
Speed range II (Road)	0,02 km/h (0.01 mile/h) to 50 km/h (31 mile/h)
Speed (backwards)	
Speed range I (field)	0,02 km/h (0.01 mile/h) to 20 km/h (12 mile/h)
Speed range II (road)	0,02 km/h (0.01 mile/h) to 25 km/h (16 mile/h)
Acceleration rate I (if the joystick is touched once at rated engine speed)	0,02 km/h (0.01 mile/h) to 0,5 km/h (0.3 mile/h) (adjustable)
Acceleration rate II (if the joystick is touched once at rated engine speed)	0,5 km/h (0.3 mile/h)
Acceleration rate III (if the joystick is touched once at rated engine speed)	1,0 km/h (0.6 mile/h)
Acceleration rate IV (if the joystick is touched once at rated engine speed)	2,0 km/h (1 mile/h)

Specifications apply to Vario 924–Vario 939

Front PTO transmission 1000 rpm	
Front PTO transmission oil Oil grade	FENDT Extra Trans 10W-40 or SAE 10W - 40 SAE 15W - 40
Oil quantity: transmission oil inc. pressure filter **Note:** Oil level to be checked at the front axle	3,5 l (0.9 gal (US))
PTO shaft profile (inches)	Splined shaft profile 1 3/8" (6 splines)
Rotational direction of the front PTO	Right as viewed in the direction of travel
Engine speed for PTO rpm: 1000 rpm	2070 rpm
PTO speed at engine rated speed (2100 rpm) 1000 Setting	1063 rpm
Max. permissible torque in front PTO with 1000 Setting	1300 Nm (959 lbf ft)

The following specifications apply to: Vario 924–Vario 939

Rear PTO transmission (540E/1000) or (1000/1000E)	
PTO shaft profile (inches)	**Splined shaft profile* (standard)** 1 3/8" x 6 splines
Flange PTO (standard)	**Involute profile*** 1 3/8" x 21 splines
Note: * Only for implements with a max. power requirement of 103 kW / 140 HP	**Splined shaft profile** 1 3/4" (6 splines)
	Involute profile 1 3/4" x 20 splines
Rotational direction of the rear PTO	Right (clockwise) viewed in the direction of travel
Engine speed for PTO rpm:	
750 rpm (540E PTO setting)	1577 rpm
1000 rpm (1000 PTO setting)	1970 rpm
1400 rpm (1000E PTO setting)	1605 rpm
PTO speed at engine rated speed (2100 rpm)	
540E setting	753 rpm
1000 Setting	1117 rpm
1000E setting	1370 rpm
Max. permissible torque in rear PTO with	
540E setting	2100 Nm (1549 lbf ft)
1000 Setting	1600 Nm (1180 lbf ft)
1000E setting	1600 Nm (1180 lbf ft)

NOTE: *Any modifications to the power output and/or max. speed setting will invalidate the warranty - this also applies to the exceeding of permissible loads and weights.*

NOTE: *PTO operation: If the application should exceed the maximum permissible torque then a PTO drive shaft with an incorporated safety clutch, and if necessary a free wheel, must be used. Maximum failsafe mechanism to prevent blocking at peak torques of 4000 Nm (2950 lbf ft).*

NOTE: *Weights, axle loads and/or speeds may be reduced to comply with legislation in individual countries.*

3 Technical data: Diesel engine

Tractor type	924	927	930	933	936
Engine type	Deutz TCD 7.8 L6				
Operating type:	4-stroke diesel - direct injection - water cooled				
Injection system	Deutz Common Rail (DCR) Electronic Engine Management EDC 17				
Pollutants — emission levels	2005/13/EC category 3B / EPA 4i				
Rotational direction when looking at the flywheel	left rotation (counter-clockwise)				
Engine weight approx.	450 kg (992 lb)				
Rated power ECE R24 at 2100 rpm	154 kW	177 kW	199 kW	221 kW	243 kW
Maximum power ECE R24 at 1800 rpm	177 kW	199 kW	221 kW	243 kW	265 kW
Rated power EG 97/68 at 2100 rpm	183 kW	194 kW	217 kW	238 kW	261 kW
Maximum power EG 97/68 at 1900 rpm	189 kW	202 kW	224 kW	245 kW	269 kW
Maximum torque ECE R24 at 1450 rpm	1049 Nm (774 lbf ft)	1116 Nm (823 lbf ft)	1234 Nm (910 lbf ft)	1326 Nm (978 lbf ft)	1498 Nm (1105 lbf ft)
Idle speed	780 ± 30 rpm				
Rated speed	2100 rpm				
No-load engine speed	2205 ± 30 rpm				
Engine tilt **Note:** Ensure vehicle stability! Lengthwise in direction of travel high/low	25 degrees				
Across in direction of travel left/right	25 degrees				
External exhaust gas recirculation	No				
Turbocharger with wastegate bypass valve	Yes				
Common Rail injection system	Yes				
Engine cooling	Water				
Intercooler	Air³				
Engine oil cooler	Water				
Cylinder	6 (in-line)				
Displacement	7755 cm³ (473.21 in³)				
Bore/stroke	110 mm (4.3 in)/136 mm (5.4 in)				
Firing order (cylinder # 1 at flywheel)	1 - 5 - 3 - 6 - 2 - 4				
Compression ratio	18 : 1				

Specifications apply to Vario 924–Vario 939

Cooling system	
Cooling type	Fan with Viscotronic coupling
Coolant quantity (approx.) (engine content only, without radiator)	9,2 l (2.4 gal (US))
Proportion of cooling system protective inhibitor min./max. (vol. %)	35/45

Specifications apply to Vario 924–Vario 939

engine lubrication	
Oil quantity	38,0 l (10.0 gal (US))
Difference in oil volume between "Min" and "Max" marks on dipstick	approx. 5 l (1.3 gal (US))
Oil grade	FENDT Ultra Grade 10W-40 UHPD

Specifications apply to Vario 924–Vario 939

Fuel system	
Fuel	**Diesel** in accordance with DIN EN 590 and DIN 51628
Fuel tank capacity	600 l (158.5 gal (US))
Adblue filling capacity	60 l (15.9 gal (US))

Specifications apply to Vario 924–Vario 939

Valves	
Number of inlet valves	2
Number of exhaust valves	2
Valve clearance: inlet valve/exhaust valve (degrees) with a cold engine (below 50 °C (122 °F)) Using adjustment tool: X899.980.236.030	75/105
Locknut on valve adjustment screw	20 Nm (15 lbf ft)

4 Technical data: Front axle

Specifications apply to Vario 924–Vario 939

Front axle:	
Manufacturer	Type 970
Oil quality	Fendt Super Trans 85W-90 or Hypoid transmission oil 85W-90 according to API GL -5. SAE 85W-90, SAE 80W-90, SAE 90 according to API GL -5. Do not use STOU or other universal oils.
Capacity Axle housing:	 Single-circuit brake 36,0 l (9.5 gal (US)) Dual-circuit brake 17,5 l (4.6 gal (US))
Planetary final drives (each side)	4,4 l (1.2 gal (US))
Steering angle	50 degrees
Oscillation angle: compressed	-17 degrees
Oscillation angle: decompressed	+11 degrees
Toe-in	0 mm (0.0 in) ... 2 mm + (0.08 in)
Cylinder diameter	80 mm (3.2 in)
Piston rod diameter	63 mm (2.5 in)
Suspension travel/stroke	155 mm (6.1 in)

5 Technical data: Air conditioning system in cab - EPC control valve

Air conditioning system — The following specifications apply to Vario 924–Vario 939

Air conditioning system	
R 134a refrigerant (max.)	1100 g (38.80 oz)
PAG ND8 refrigerant oil (total) X902.013.573.000	250 cm^3 (15.25 in^3)
V-belt tension (strand tension) measured at the centre point between pulleys, using an Opti-belt tension gauge	400 N ± 50 N

Cab — The following specifications apply to Vario 924–Vario 939

Windscreen washer	
Capacity	approx. 4,3 l (1.1 gal (US))

EPC control valve — The following specifications apply to Vario 924–Vario 939

EPC control valve	
Operating pressure	200 bar (2901 psi) ± 10 bar (145 psi)

Specifications apply to Vario 924–Vario 939

Rear power lift	
Lift cylinder internal/external diameter	2x 40 mm (1.6 in)/105 mm (4.1 in)
Lift cylinder stroke	272 mm (10.7 in)
Three-point linkage (category)	2/3
Lower linkages inside widths in accordance with Cat. 2/3	825 mm (32.5 in)/965 mm (38.0 in)
Distance between the lower linkage coupling points (spreading dimension)	870 mm (34.3 in)/1010 mm (39.8 in)
Continuous lifting power at mounting point	11800 daN
Maximum lifting power at drawbar	8018 daN

6 Technical data: Compressed air system, Electrics & Front power lift

Compressed air system — The following specifications apply to Vario 924–Vario 939

Compressed air system	
Capacity of standard air receiver	2 x 15 l (4.0 gal (US)) + 2 x 10 l (2.6 gal (US))
Capacity of additional air receiver (optional)	2 x 10 l (2.6 gal (US))

Electrical system — specifications apply to Vario 924–Vario 939

Electrical system	
Operating voltage (VDC)	12
Battery (V/Ah)	12 / 170
Three-phase alternator (V/A)	2x 14/150
Starter (kW)	4.7 kW

Front power lift — specifications apply to Vario 924–Vario 939

Hydr. actuation	
Operating pressure	200 bar (2901 psi)
Lift cylinder diameter (piston rod / cylinder)	1x 36 mm (1.4 in)/80 mm (3.2 in)
Lift cylinder stroke	210 mm (8.3 in)

Specifications apply to Vario 924–Vario 939

Front power lift	
Three-point linkage ISO 730 (category)	2
Lower linkages inside width in accordance with standard	825 mm (32.5 in)
Catch hook clearance in accordance with standard	870 mm (34.3 in)
Max. lifting capacity at mounting point	5550 daN
Implement weight up to about (centre of gravity: 800 mm (31.5 in), 5° device pull-in)	4100 kg (9039 lb)

7 Technical data: Hydraulic equipment

Specifications apply to Vario 924–Vario 939

Working and steering hydraulics	
Auxiliary spool valve flow rate 1.1 "yellow" to 2.2 "grey" 1.4 "green" (optional) The flow rate can be infinitely adjusted using a flow control	 1 to 100 l/min (26.4 gal/min (US)) 1 to 140 l/min (37.0 gal/min (US))

Specifications apply to Vario 924–Vario 939

Filling capacity / Useable volume / Hydraulic pump	
Max. filling capacity	approx. 110 l (29.1 gal (US))
Useable volume at max. capacity	85 l (22.5 gal (US))
Maximum operating pressure	200 bar (2901 psi)
Standby pressure	20 bar (290 psi)
Oil grade	**Bio hydraulic oil**
	FENDT Super Hyd
	FENDT Extra Hyd 68
	or
	Universal tractor oil (STOU)
	STOU SAE 5W-30
	STOU SAE 5W-40
	STOU SAE 10W-30
	STOU SAE 10W-40
	STOU SAE 15W-30
	STOU SAE 15W-40
	or
	Engine oil in accordance with API-CD
	HD-SAE 5W-30
	HD-SAE 5W-40
	HD-SAE 10W-30
	HD-SAE 10W-40
	HD-SAE 15W-30
	HD-SAE 15W-40
	Also permitted at temperatures above 10 °C (50 °F)
	HD-SAE 20W-20 in accordance with API-CD

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

B

Faults