Workshop Service Manual

FENDT 700 Vario SCR (Stage 3b)

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2 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. 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 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.

3 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 more than 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!*

To release pressure:

– Screw in the knurled-head screw on the **Y013** - Suspension lowering solenoid valve; the chassis may be lowered

– Screw in the knurled-head screw on the **Y014** - Suspension raising solenoid valve; the rebound accumulator will be relieved

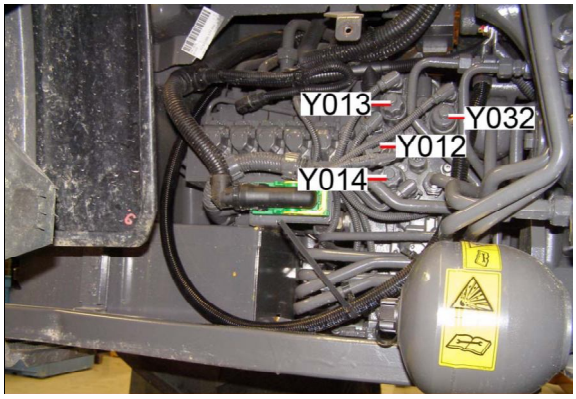


Fig. 1. I028783

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 hydraulic 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.

To release pressure:

1. Engine must be off
2. Make sure the tractor is secured to prevent it rolling
3. Actuate the foot brake at least 5x

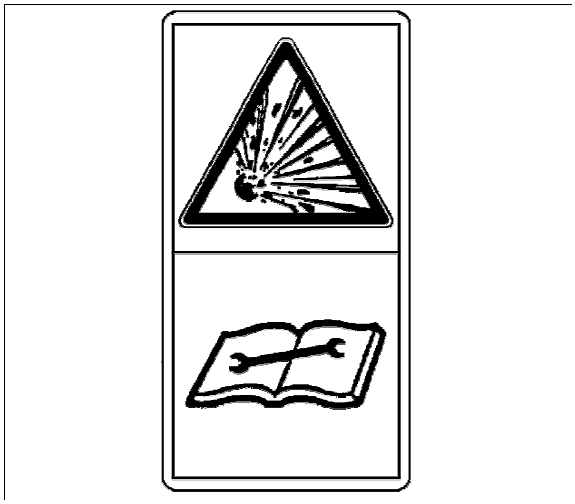


Fig. 2. I000010

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 and 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.

4 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.*

5 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

6 Location of rating plates

Location of rating plates

Vehicle rating plate

On the right-hand side of the frame

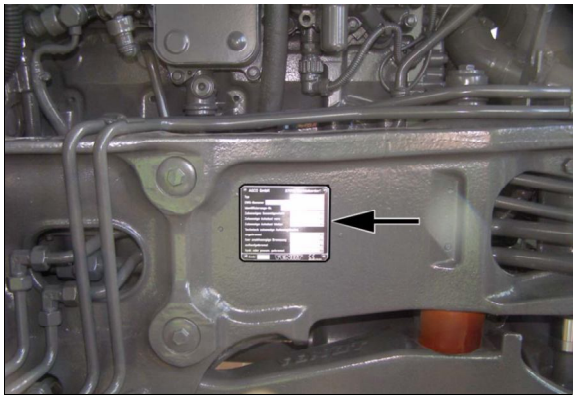


Fig. 3. I034170

Stamped chassis number

On the right-hand side of the frame, at the front

Fig. 4. I034177

Front axle rating plate

Right-hand side, on front axle

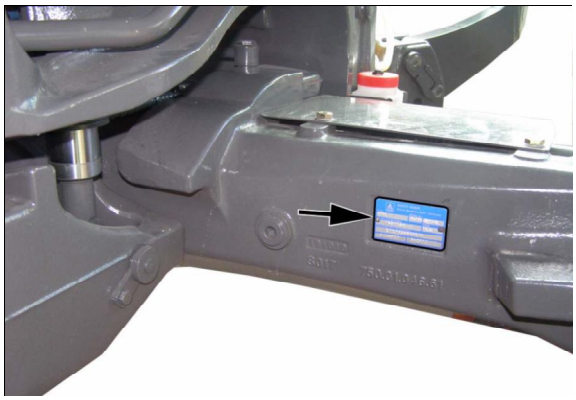


Fig. 5. I034175

Diesel engine rating plate

At the top of the valve cover and on the right-hand side of the crankcase

Fig. 6. I034176

Transmission rating plate

On the right-hand side of the transmission housing, behind the heat exchanger

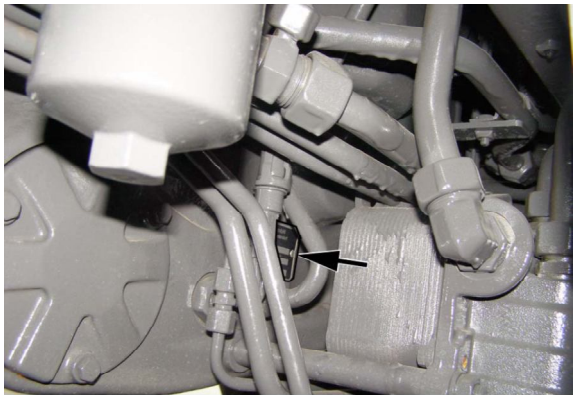
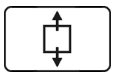


Fig. 7. I034181

Vario transmission insert rating plate

At the top of the Vario transmission insert



Remove cab, remove transmission cover

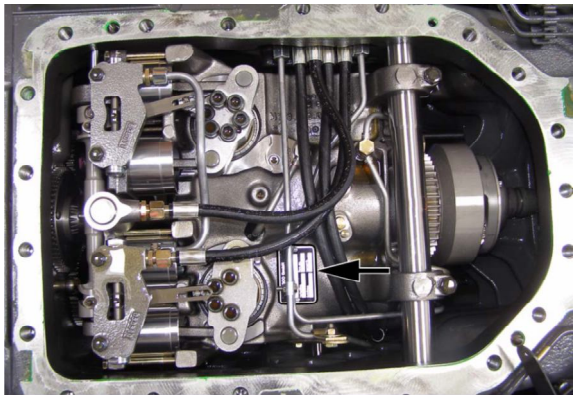


Fig. 8. I034168

Cab rating plate

In the cab, on the left-hand B-pillar between the panel and the side plate

Fig. 9. I034169

Trailer frame rating plate

NOTE: *See also: Operating Manual*

On the right-hand side of the trailer frame

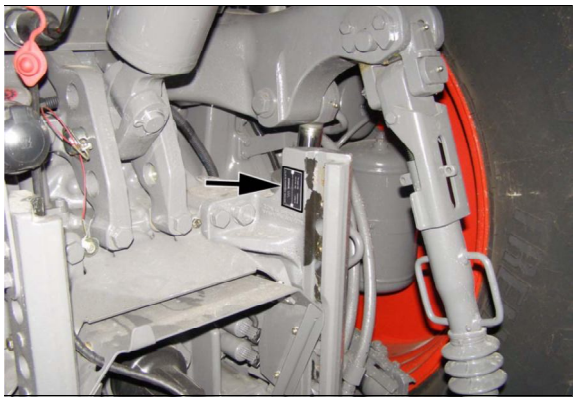


Fig. 10. I034178

Automatic trailer hitch rating plate

NOTE: *See also: Operating Manual*

On the trailer hitch

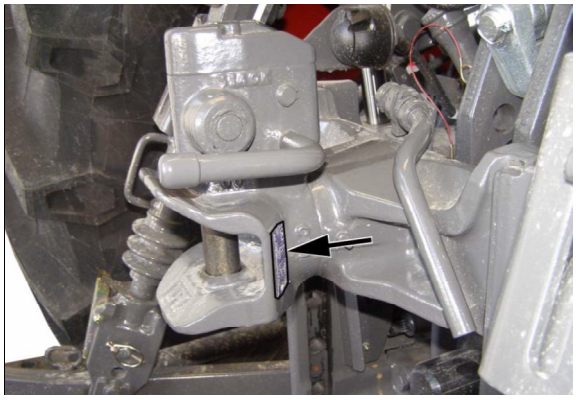


Fig. 11. I034180

Ball-type coupling (height adjustable) rating plate

NOTE: *See also: Operating Manual*

On the ball-type coupling

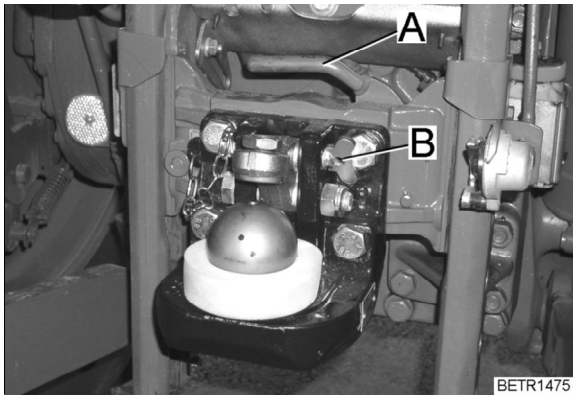


Fig. 12. I002601

Ball-type coupling rating plate

NOTE: *See also: Operating Manual*

On the ball-type coupling

Fig. 13. I002599

Draw bar rating plate

NOTE: *See also: Operating Manual*

On the draw bar

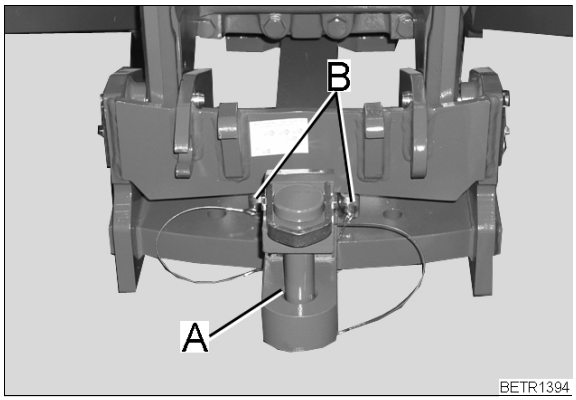


Fig. 14. I002602