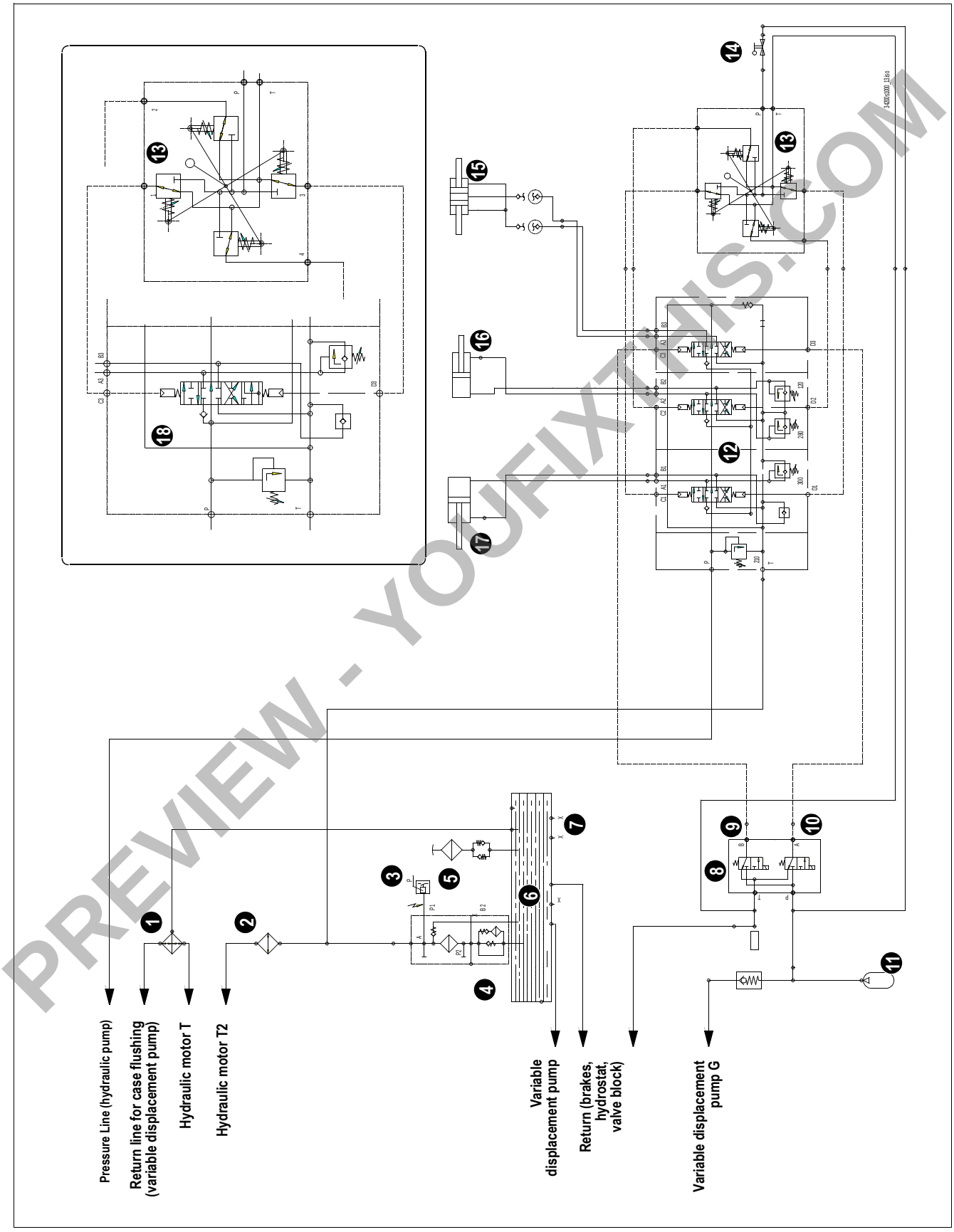
9.15 Work hydraulics diagram



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Brake cylinder – front axle

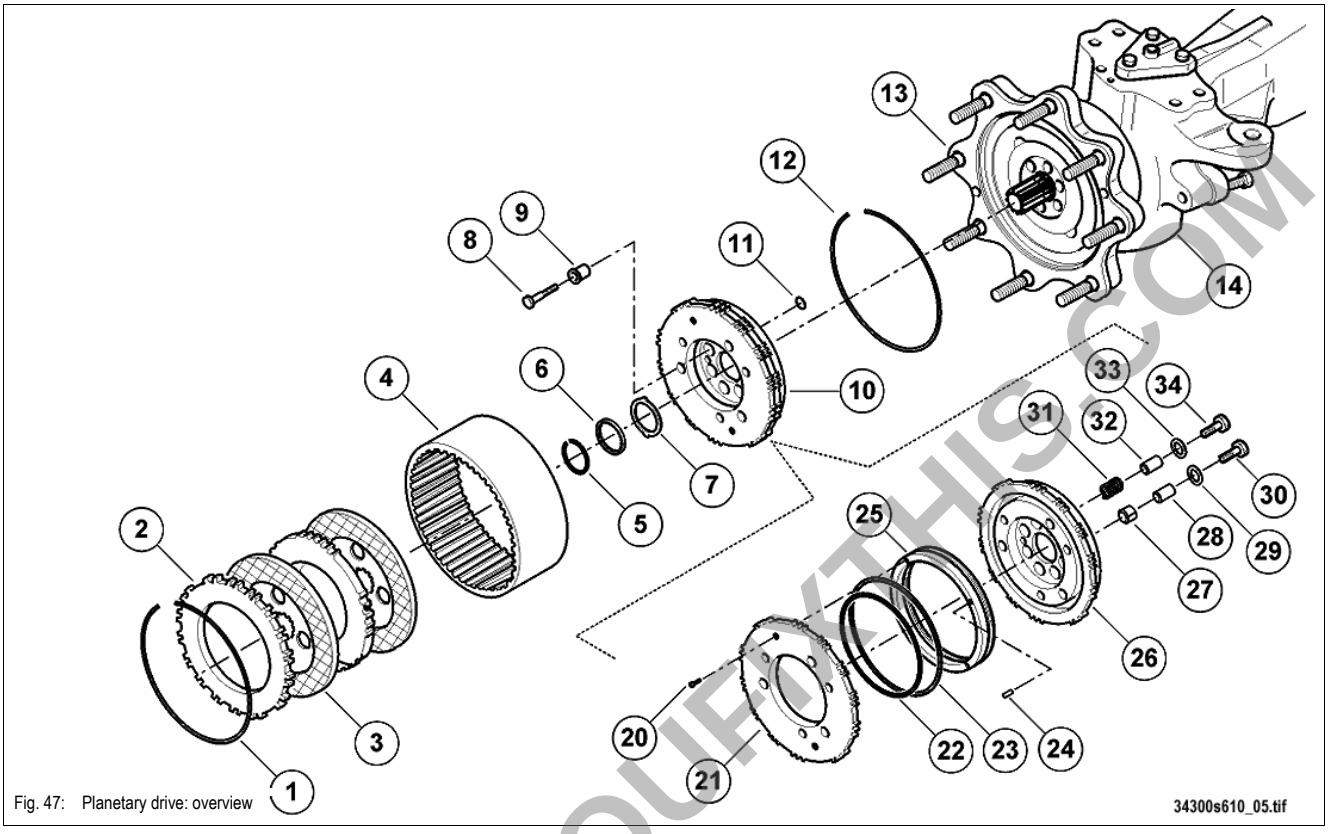


Fig. 47: Planetary drive: overview

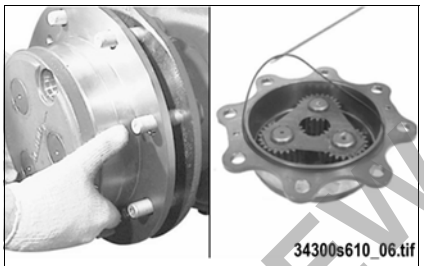


Fig. 48: Removing the planetary carrier

Environment!

Collect the drained oil in a suitable container and dispose of it in a manner consistent with environmental laws!

☞ *Remove the planetary carrier*

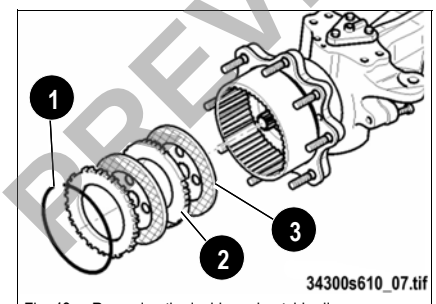


Fig. 49: Removing the inside and outside discs

☞ *Remove circlip* **1**

☞ *Remove inside and outside discs* **2** *and* **3**

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2.15 Tightening torques

General tightening torques

Cap screw dimensions	Torques in lb.-ft. (Nm)[1]		
	Grade 7 (8.8)	Grade 8 (10.9)	Grade 10 (12.9)
M4	2 (3)	3 (4)	4 (5)
M5	4 (5.5)	6 (8)	7 (10)
M6	7 (10)	10 (14)	12 (16)
M8	17 (23)	25 (34)	30 (40)
M10	34 (46)	49 (67)	58 (79)
M12	58 (79)	85 (115)	100 (135)
M14	92 (125)	136 (185)	162 (220)
M16	144 (195)	214 (290)	251 (340)
M18	207 (280)	295 (400)	347 (470)
M20	291 (395)	413 (560)	487 (660)
M22	398 (540)	561 (760)	656 (890)
M24	502 (680)	715 (970)	848 (1150)
M27	738 (1000)	1069 (1450)	1254 (1700)
M30	996 (1350)	1438 (1950)	1696 (2300)

1. These values are valid for cap screws with untreated, non-lubricated surfaces

Specific tightening torques

Description	Torque
Wheel nut	295 ±15 lb.-ft. (400 ±20 Nm)
Track-rod end (steering cylinder)	148 lb.-ft. (200 Nm)
Piston rod (steering cylinder/track rod)	184 lb.-ft. (250 Nm)

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Sealing the bleeder valve



Fig. 36: Bleeder valve

☞ *Remove the cover*
☞ *Clean the bleeder valve*
☞ *Mount a new O-ring*
☞ *Mount the cover*
➥ Tightening torque: **6.3 lb.-ft. (8.5 Nm)**

Intake/exhaust manifold



Fig. 37: Intake manifold seals

☞ *Mount new gaskets*
☞ *Mount the intake/exhaust manifold*

Tightening torque
➥ Intake manifold: **15.5 lb.-ft. (21 Nm)**
➥ Exhaust manifold **40.5 lb.-ft. (55 Nm)**

4. 8 Engine trouble

Problem	Possible causes
Engine does not start or is not easy to start	Parking brake not applied
	Steering-column control lever not in neutral
	Engine starting temperature too low
	Wrong SAE grade of engine lubrication oil
	Fuel quality does not comply with specifications
	Battery defective or dead
	Loose or oxidized cable connections in starter circuit
	Starter defective, or pinion does not engage
	Wrong valve tip clearance
	Fuel injector defective
Engine starts, but does not run smoothly or faultless	Fuel quality does not comply with specifications
	Wrong valve tip clearance
	Injection line leaks
	Fuel injector defective

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2 Specifications

2.1 Frame

Sturdy steel sheet frame, rubber-mounted engine

2.2 Engine

Engine	
Product	Deutz diesel engine
Model	F4M 2011
Type	In-line
No. of cylinders	4
Displacement	190 in.³ (3109 cm³)
Bore and stroke	3.7 x 4.4” (94 x 112 mm)
Compression ratio	19:1
Output (as per ISO 9249)	44 kW/59 DIN hp at 2400 rpm
Max. torque	144 lb.-ft. (195 Nm) at 1700 rpm
Specific minimum fuel consumption	298 g/hph (222 g/kWh)
Fuel injection system	Direct fuel injection
Firing order	1 – 3 – 4 – 2
Starting aid	Glow plug
Max. inclined position (engine no longer supplied with oil):	Max. lateral left/right inclination: 30/57% Max. uphill/downhill inclination: 30/57% **Follow tilting limit of the machine.**
Oil pressure	44 – 65 psi (3.0 – 4.5 bar) at 2300 rpm
Valve clearance (engine at cold temperature)	Intake valve 0.012" (0.3 mm) Exhaust valve 0.020" (0.5 mm)

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3. 3 Maintenance schedule Model 480 (overview)

Work description For service and maintenance work on the attachment, please refer to the Operator's and maintenance Manual of the attachment manufacturer as well.	Maintenance schedule/service hours					
	Maintenance work (daily)	Delivery inspection	"A" every 50 hours (weekly)	1st Inspection[1] at 100 hours	"B" every 500 service hours[2] 2nd Inspection	"C" every 1500 service hours (yearly)
Oil and filter changes ( ):						
Perform the following oil and filter changes (check oil levels after test run):						
• Engine oil				●	●	●
• Engine oil filter				●	●	●
• Fuel filter				●	●	●
• Air filter insert [3, 4] replace safety cartridge every 3rd time the air filter insert is replaced					●	●
• Gearbox oil in front and rear axle differentials and in rear axle gearbox				●		●
• Gearbox oil in front and rear axle planetary drives (left and right)				●		●
• Gearbox oil in 25 mph (40 km/h) gearbox (option)				●		●
• Hydraulic oil[5]						●
• Hydraulic oil filter insert				●		●
• Breather filter – hydraulic oil tank [4]						●
Inspection work ( ):						
Check the following material. Refill if necessary:						
• Engine oil	●	●	●			
• Hydraulic oil	●	●	●	●	●	●
• Gearbox oil in front and rear axle differentials and in rear axle gearbox		●			●	●
• Gearbox oil in front and rear axle planetary drives (left and right)		●			●	●
• Brake fluid[6]	●	●	●	●	●	●
Check cooler for engine and hydraulic oil for contamination. Clean if necessary[7]			●	●	●	●
When using biodegradable oil: Drain the condensation water in the hydraulic oil tank [5]					●	●
Clean dust valve on air filter housing [3]	●	●	●	●	●	●
V-belt: Check condition and pre-tension. Tighten or replace if necessary[8]		●	●	●	●	●
Check the fuel/water separator. Drain water if necessary			●	●	●	●

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Cleaning the fuel pump screen filter

WARNING!

If the fuel, as it drains, comes into contact with hot engine parts or the exhaust system, there is an increased

Risk of burns!

☞ *Never clean the screen of the filter when the engine is hot!*

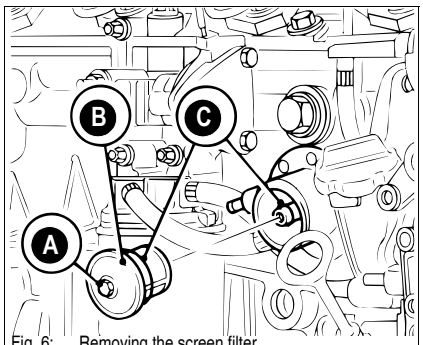


Fig. 6: Removing the screen filter

☞ *Proceed as follows:*

- Pinch off fuel feed line 2/**B** with a suitable tool
- Loosen and unscrew hexagon head screw **A**
- Remove fuel screen **B** (cover and screen come out together)
- Clean fuel screen **B** with fuel, replace if necessary
- Position sealing rings **C**
- Fit fuel screen **B** (cover with screen) back on
- Tighten hexagon head screw **A**
- Remove the tool which has been used to pinch off the fuel feed line 2/**B**
- Make a test run – and check for tightness!

NOTE: The fuel system of the machine bleeds itself automatically!

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4. 5 Checking and adjusting valve tip clearance

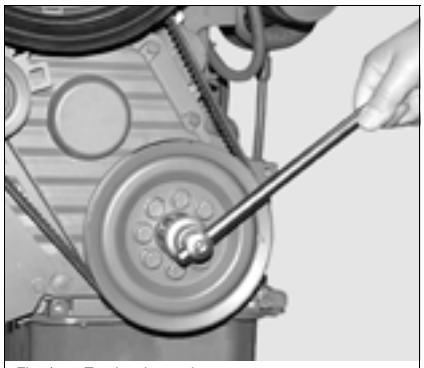


Fig. 1: Turning the engine

☞ *Standard setting of valve tip clearance is possible:*

➥ On a cold engine, or on a warm engine after it has cooled down for at least 0.5 h.

➥ Oil temperature = 176° F (80° C)

IMPORTANT!

Increase valve tip clearance by 0.040" (0.1 mm) every time the cylinder head gasket is changed. Set valve tip clearance to standard after 1000 service hours.

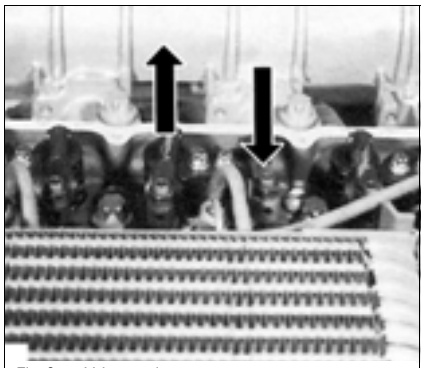


Fig. 2: Valve overlap

The cylinder-head cover has been removed

☞ *Turn the engine until reaching valve overlap, cylinder no. 1*

NOTE: Valve overlap means the exhaust valve is not yet closed and the intake valve begins to open. Both push rods cannot be turned.



Fig. 3: Setting valve tip clearance

☞ *Set valve tip clearance at each cylinder with the feeler gauge.*

➥ Inlet valve tip clearance: 0.012" (0.3 mm)

➥ Exhaust valve tip clearance:0.0.020" (0.5 mm)

☞ *Tighten the locknut.*

➥ Tightening torque: 20 ± 1.48 lb.-ft. (27 ± 2 Nm)

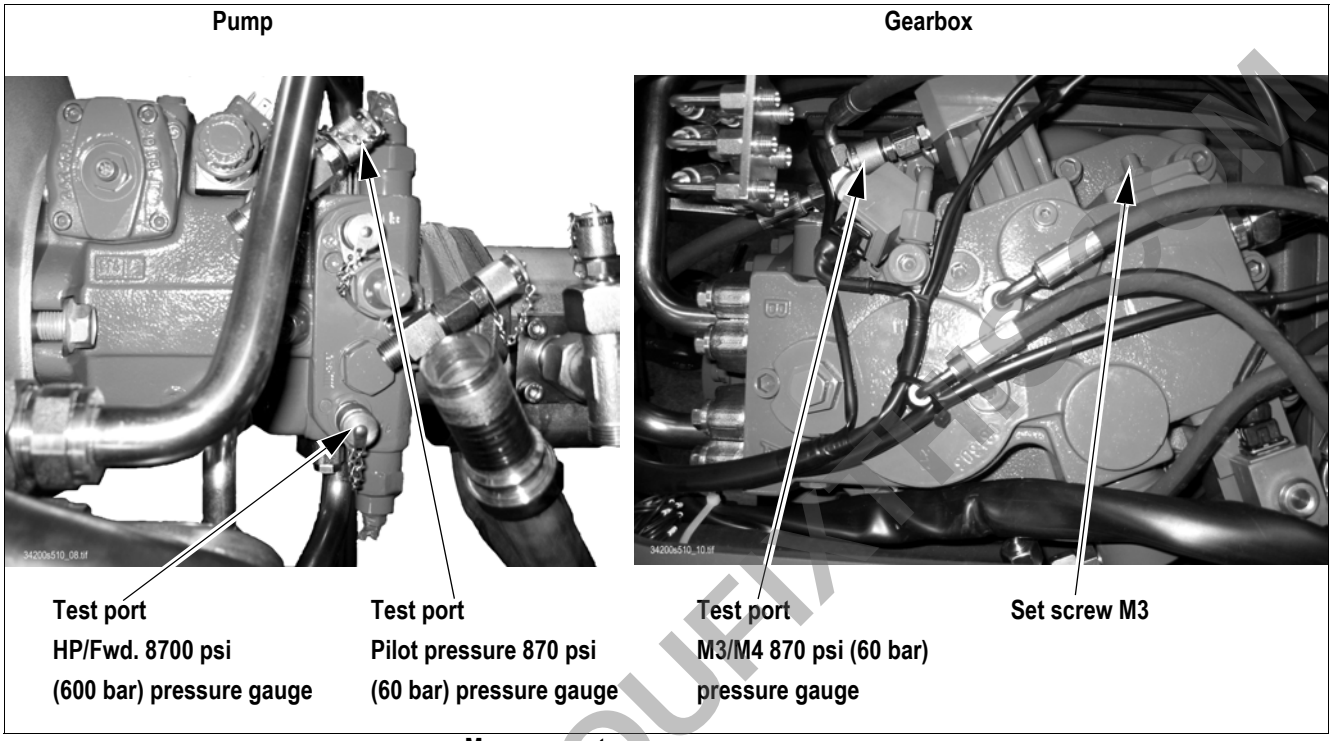
➥ Check the setting again with the feeler gauge.

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5.14 ECO speed settings

Control initiation M3: settings



Measurement:

☞ *Turn on 2nd speed (steering in straight ahead position)*

☞ *Slowly increase diesel speeds until the pressure gauge of test port M3 rises to about 145 – 435 psi (10 – 30 bar).*

- Speeds must be 1500±100 rpm
- Pump pilot pressure must be 116 – 145 psi (8 – 10 bar)

- If speeds are too low when reaching the M3 pressure

  ☞ Screw in the set screw

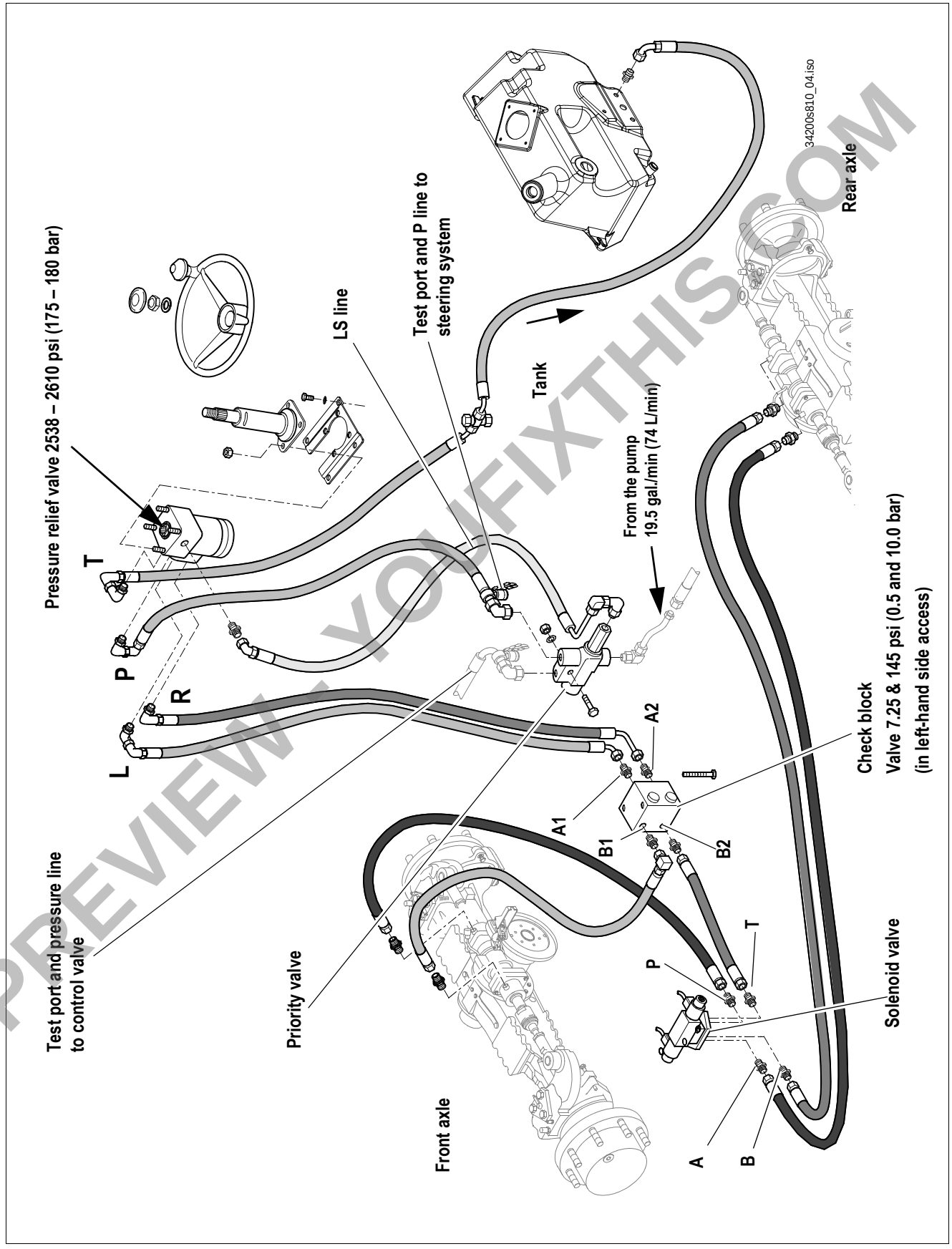
- If speeds are too high when reaching the M3 pressure

  ☞ Unscrew the set screw

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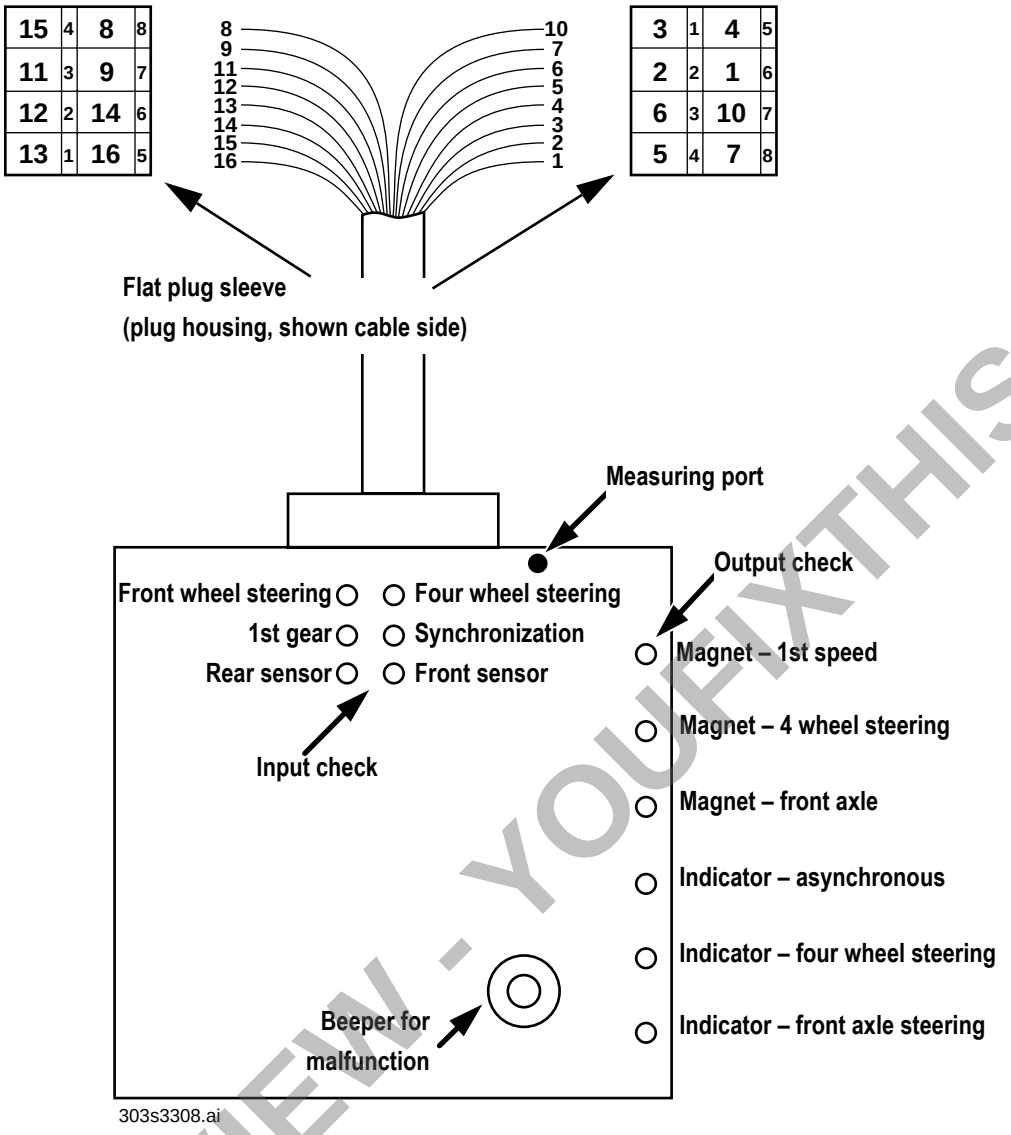
8.3 25 mph (40 km/h) steering circuit



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10.10 Steering electronics



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No.	Function	mm²
1	Input – synchronization tip switch	0.75
2	Input – 4 wheel steering	0.75
3	Input – front axle steering	0.75
4	Input – rear sensor	0.75
5	Input – front sensor	0.75
6	Input – 1st speed	0.75

No.	Function	mm²
7	Input – ground	0.75
8	Input – ground	0.75
9	Input – tip switch (electronics OFF)	0.75
10	Input – supply point +12 V	0.75
11	Output – 1st speed	0.75
12	Input – 4 wheel steering	0.75
13	Input – front axle steering	0.75
14	Input – synchronization indicator	0.75
15	Input – 4 wheel steering indicator	0.75
16	Input – front axle steering indicator	0.75

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