CS110, CS120, CS130, CS150 Tractors

Service - Training Manual Sva 7-96890

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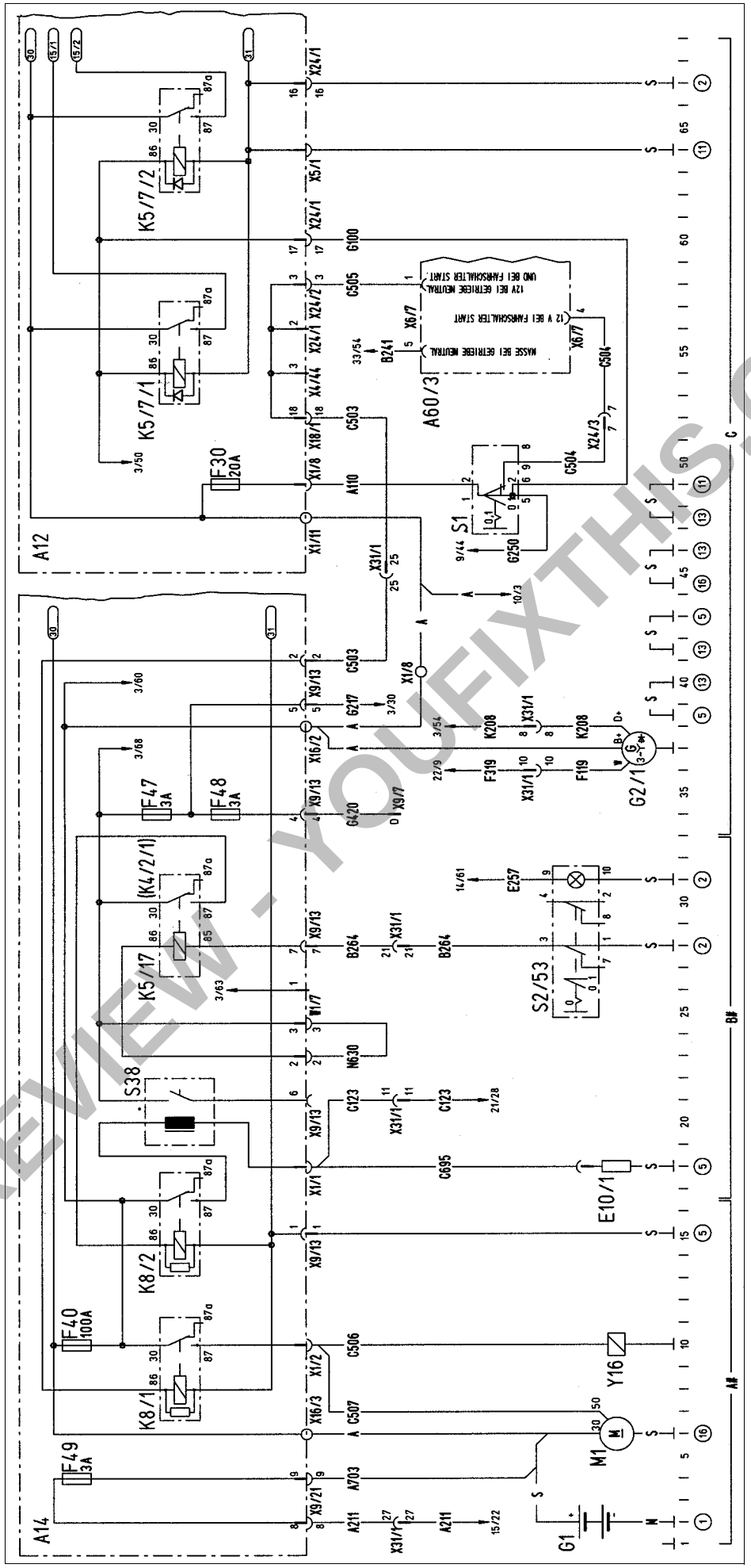
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Sva 7-96900
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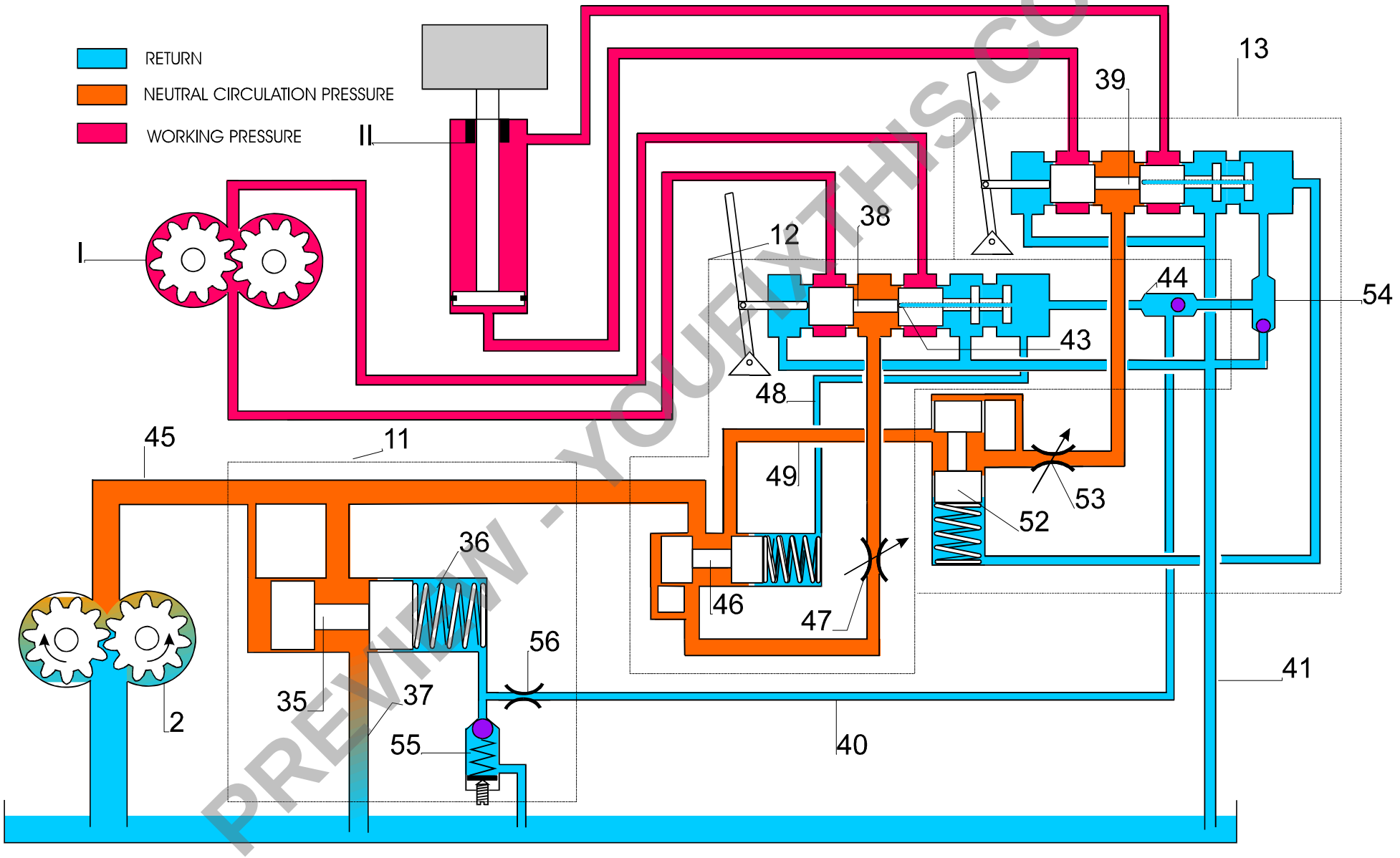
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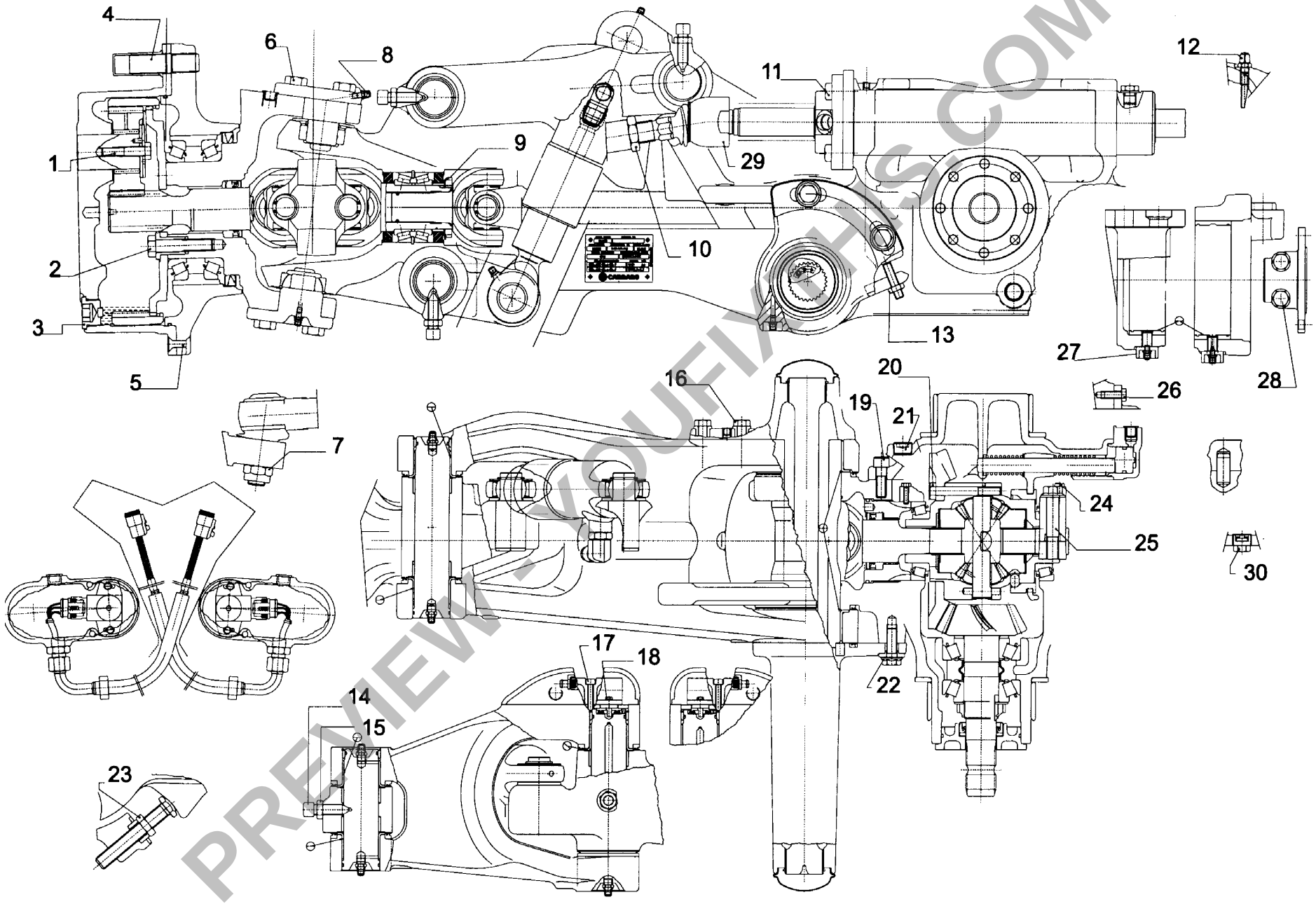
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NEUTRAL CIRCULATION



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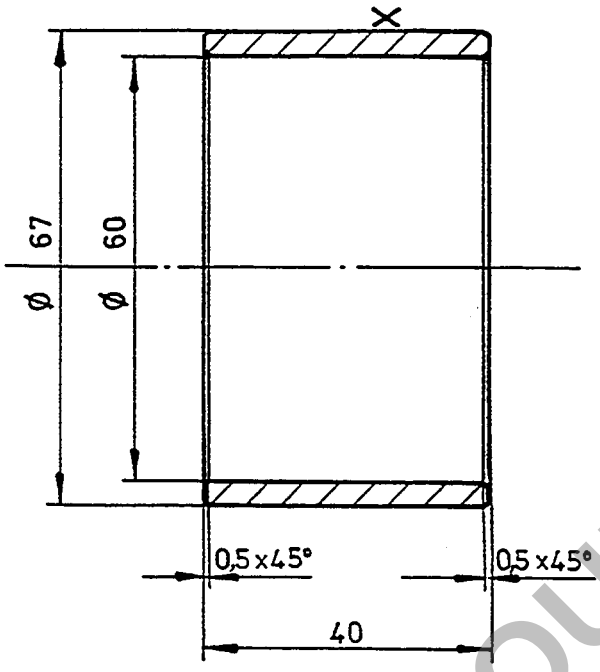
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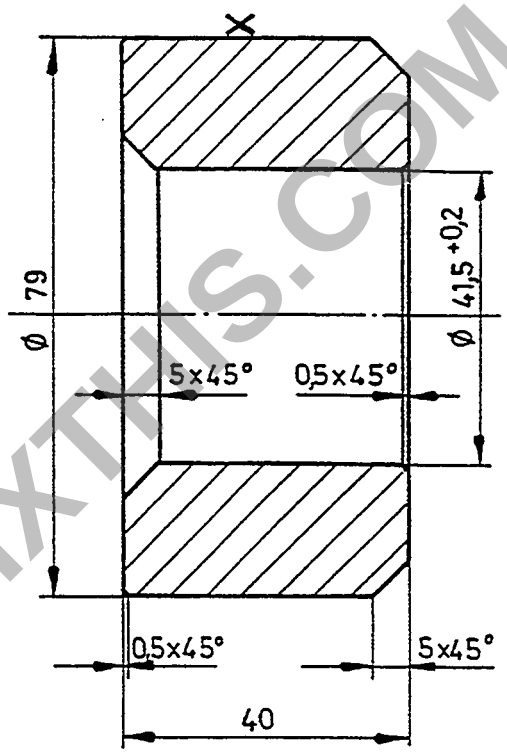
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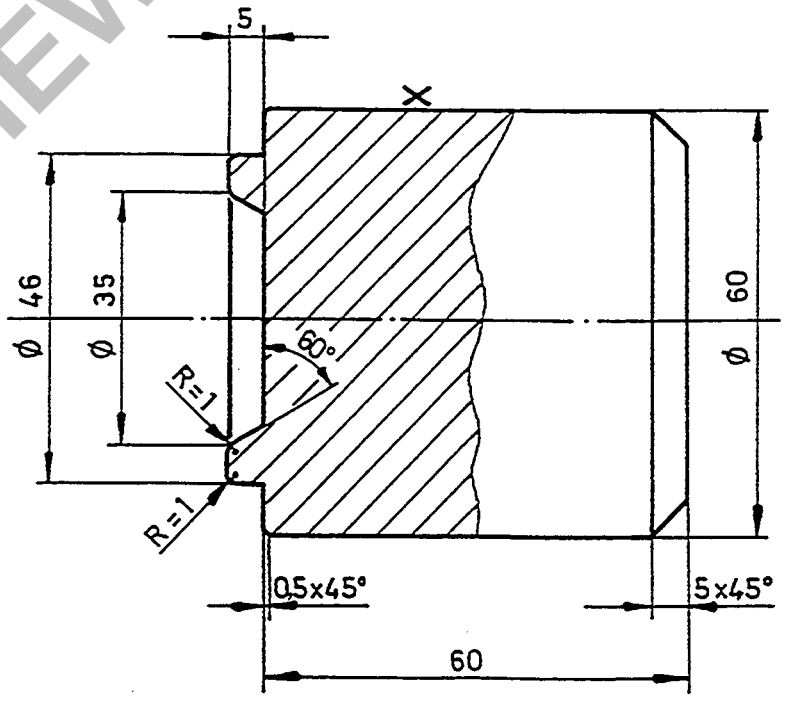
Beschriften :
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11



Beschriften :
TSW 520

13



Beschriften :
TSW 522

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11	EEPROM end-of-tape data invalid (contact pressure)	- NORMAL operating mode - Default contact pressure	- Carry out/repeat MC adjustment
12	Temperature sensor LI, S+	- Default value: cold (MCped holding time, splitter holding times, slip times) - Same operating mode	- Check cabling - Check temperature sensor - Check sensor supply - Check vehicle network voltage
13	Temperature sensor SE	- Default value: (MCped holding times, splitter holding times, slip times) - Same operating mode	- Check cabling - Check temperature sensor - Check sensor supply - Check vehicle network voltage
14	Synchronous neutral switch plausibility	- Same operating mode	- Check cabling - Check neutral switch - Check rot. speed sensor/cabling nPTO, nMC
15	Warning lamp LI (oil pressure / MC excessive rot. speed)	- Same operating mode	- Check cabling - Check lamp - Check supply to warning lamp
16	Warning lamp SE (oil pressure / MC excessive rot. speed)	- Same operating mode	- Check cabling - Check supply to warning lamp
17	Warning lamp S+ (oil pressure / MC excessive rot. speed)	- Same operating mode	- Check cabling - Check supply to warning lamp
18	System pressure plausibility	- Warning lamp lights up - Same operating mode	- Check oil pressure switch - Check cabling - Check system pressure - Check rot. speed sensor for nPSI
19	Signal line display SE	- "EE" on display, continuous beep - Same operating mode	- Check cabling - Check display
20	Signal line display S+	- "EE" on display, continuous beep - Same operating mode	- Check cabling - Check display
21	Limit speed exceeded	- Continuous beep as long as rot. speed is excessive- Same operating mode	- Reduce driving speed

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Disassembly

STEP 1

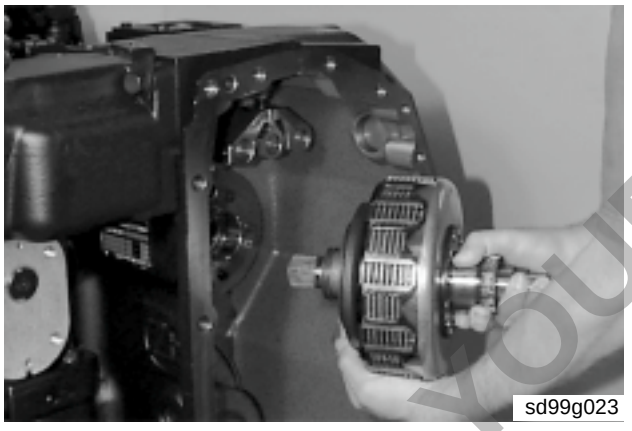
Parting the power shift transmission from the main transmission:

To part the power shift transmission from the main transmission, see Basic Workshop Manual 7-70690 (CASE) or TS 261/96 (STEYR) Section 1.1 / Page 1.01 / Fig. 1 to Page 1.02 / Fig. 5.

Power shuttle – driving clutch:

NOTE: *The disassembly power shuttle – driving clutch illustrated here is based on a transmission version "without crawler gear". Further steps regarding versions "with crawler gear" can be found in the Basic Workshop Manual.*

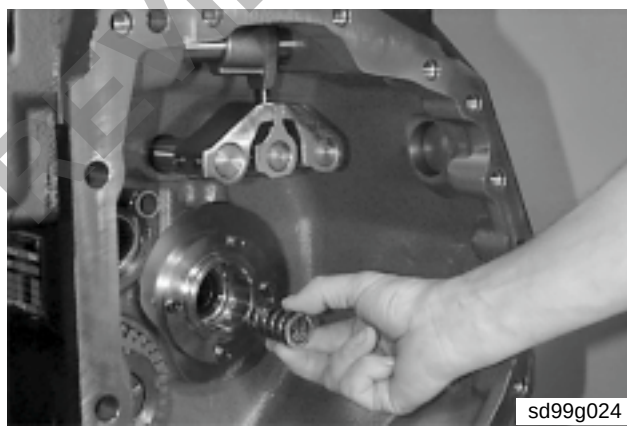
STEP 2


sd99g023

Remove the complete driving clutch from the main transmission.

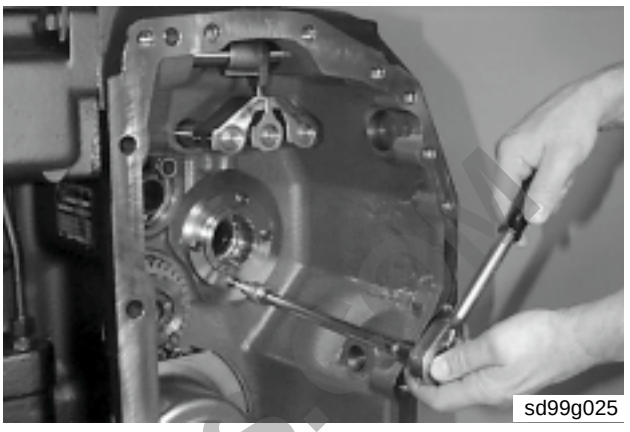
NOTE: *The packing ring exposed by this can remain on the clutch shaft (see Fig. Step 5) or in the countershaft borehole.*

STEP 3


sd99g024

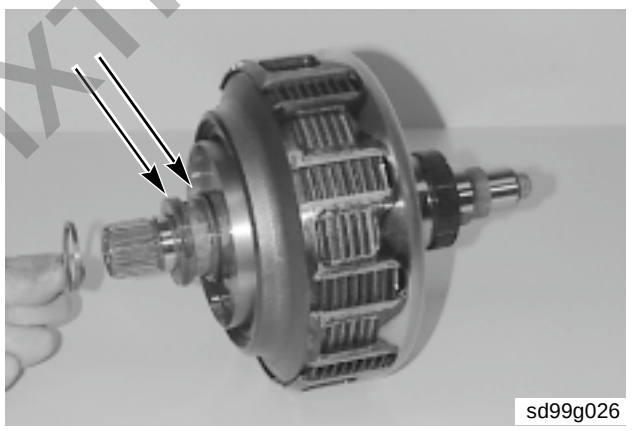
Remove the pressure spring.

STEP 4


sd99g025

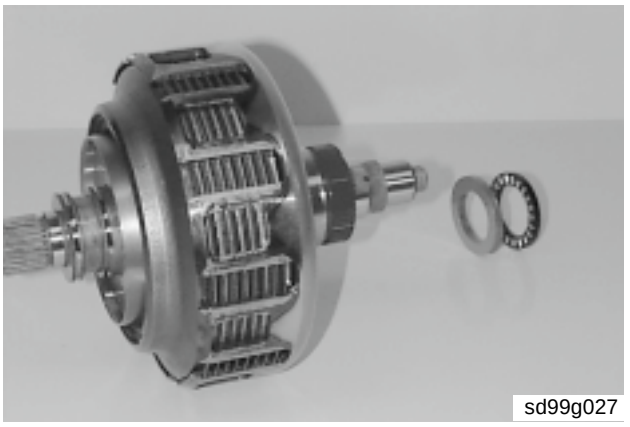
Loosen the screwed connection and pull the oil feed out of the borehole in the housing.

STEP 5


sd99g026

Remove the packing ring and both rectangular rings (arrows).

STEP 6

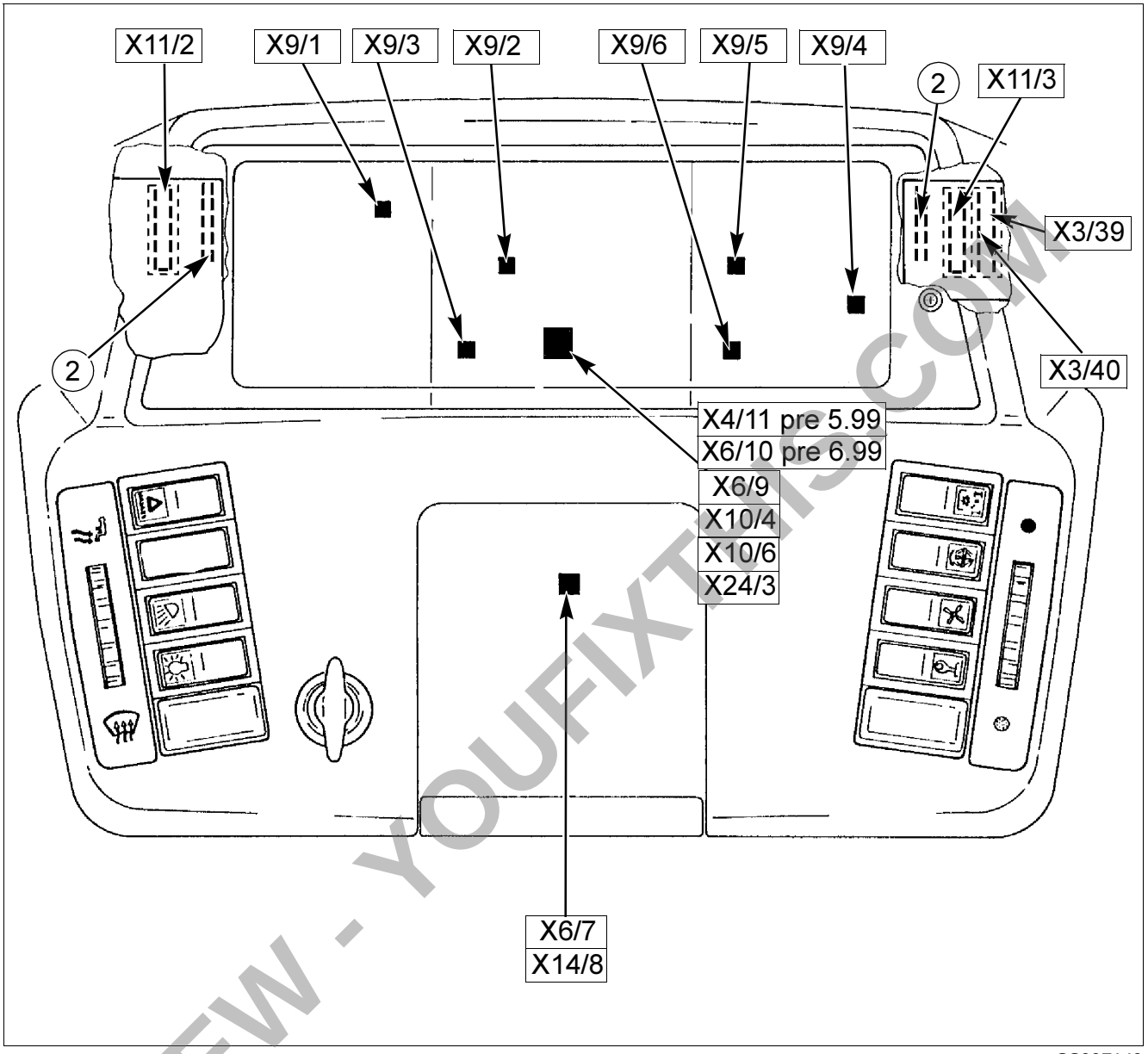

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Remove the axial roller bearing and washer.

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List of Plugs – Instrument Panel



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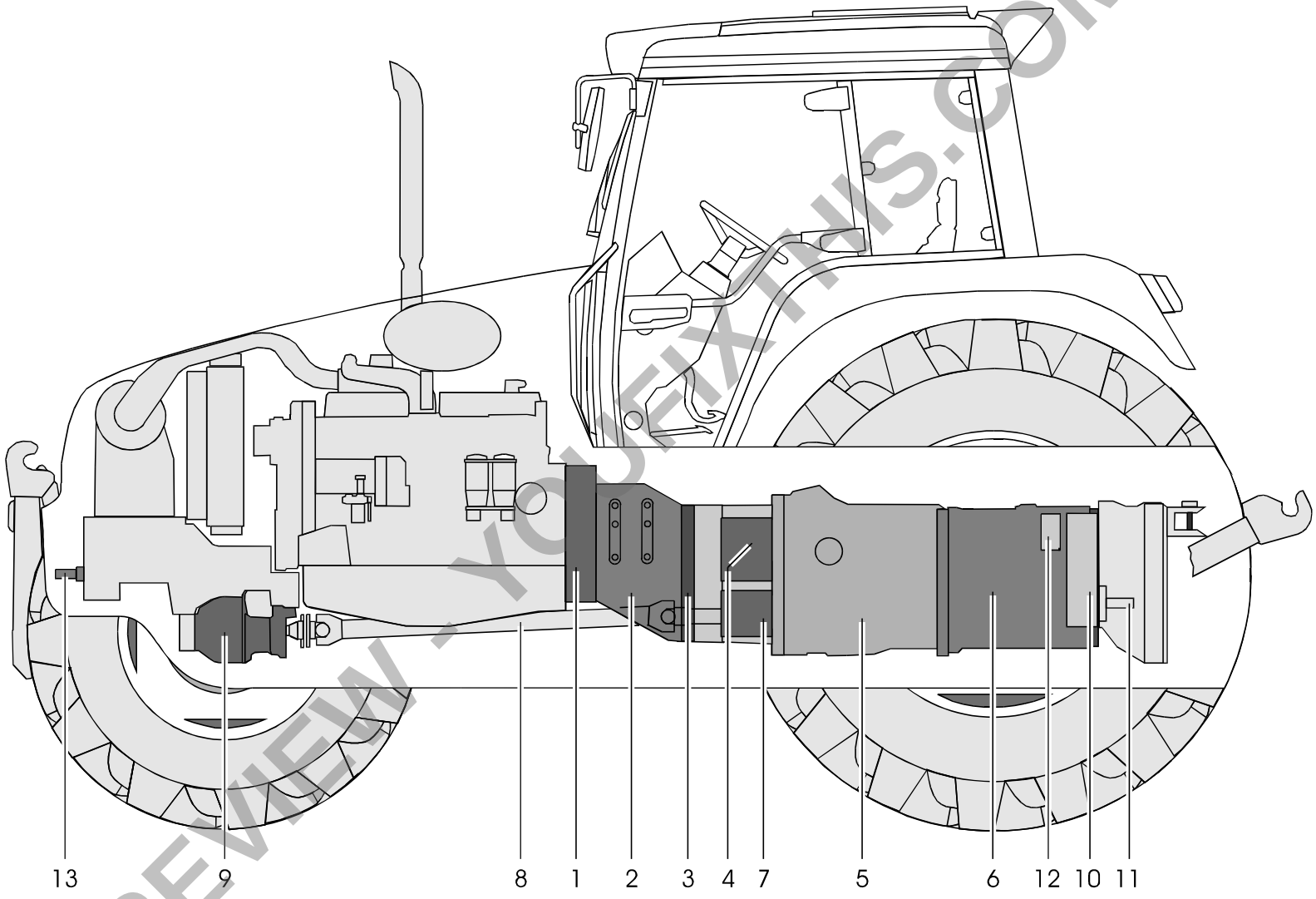


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Miscellaneous information

Fault - effect/reaction of system	Possible cause of fault	Possible remedy
No display activation/"EE" display	- EST45 "does not run up" - Communication line defective - Voltage supply defective	- Check supply paths, LI, SE - Check fuse F24 (term.15, term.30) - Check communication line (LI)
Diagnosis tool cannot set up a connection	- EST45 "does not run up" - Communication line defective - Voltage supply defective	- Ignition off/on, repeat - Check supply paths, LI, SE - Check fuse (term.15, term.30) - Check communication line (LI)
Power-shift transmission switches to neutral when starting/reversing (jolt discernible). Display: "N", forward/reverse arrows flash, **no** fault code, continuous beep	- Wrong vehicle variant selected for end-of-tape programming - nPSI and nPSO rot. speed sensors defective - Defect in hydraulic system - (Neutral through reversing monitor)	- Check/correct vehicle variant programmed for end of tape - Check cabling for rot. speed sensors for nPSI and nPSO - Check rot. speed sensors for nPSI and nPSO - Check hydraulic system
Automatic changing up/down in splitter, shift noises approx. every 1-2 sec.	- Wrong vehicle variant selected for end-of-tape programming - Rot. speed sensor for nPSI and nPSO defective, mixed up - Gear valves GV1/GV2 mixed up - Defect in hydraulic system (pressure modulation by GV toggling)	- Check/correct vehicle variant programmed for end of tape - Check cabling for rot. speed sensors for nPSI and nPSO - Check cabling for gear valves GV1/Gv2 - Check rot. speed sensors for nPSI and nPSO - Check hydraulic system
Short interruption in the tractive power whilst driving with closed drive train (power-shift pressure modulation)	- Wrong vehicle variant selected for end-of-tape programming - Rot. speed sensor for nPSI and nPSO defective - Defect in hydraulic system (pressure modulation by GV toggling)	- Check/correct vehicle variant programmed for end of tape - Check cabling for rot. speed sensors for nPSI and nPSO - Check rot. speed sensors for nPSI and nPSO - Check hydraulic system

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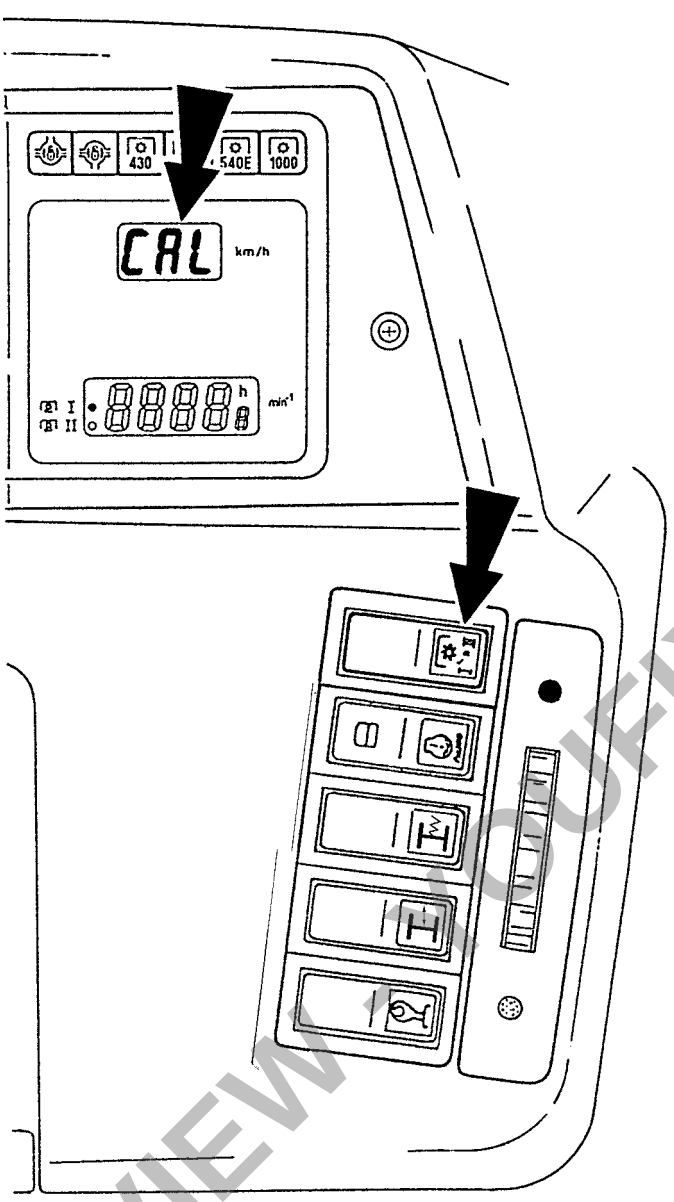
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Calibrating the speedometer

Re-calibration is required after replacing tyres or when 3 bars appear on the km/h display.



SS99H185

Measure out a distance of exactly 100 m and mark both ends clearly.

– Press the pushbutton/switchover (Rear PTO/ Front PTO/Operating hours) for at least 10 seconds, until **CAL** appears on the km/h display.

– Start to drive and when the tractor's front axle is in line with the 0 mark, press the pushbutton briefly – the letters **COU** will then appear on the display.

The impulses will be counted to 9999 on the bottom part of the display, ---- will appear above this, pay no attention to this.

WARNING: *Minimum speed within the 100 m markings = 2 km/h – it is possible to drive faster.*

– When the front axle is in line with the 100 m mark, press the pushbutton briefly once again – the letters **PRO** appear on the display.

– Bring the tractor to a halt and if the programming sequence was carried out correctly, press the pushbutton briefly once again – the tractor will then store the new, calibrated count.

If a fault occurs during calibration (delay in pressing the switch etc.) – simply switch the ignition OFF before pressing the switch for the last time, the programming sequence will thus not be accepted and the old values remain in effect.

Repeat the procedure.

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Instrument Test Values

Fuel gauge B2/1 and B2/2			
Diesel level	Resistance Ω	Pointer angle	Display range
0	10	0°	from 0 – 12°, red area
1/8	31,2	7,5°	
1/2	95	30°	from 30 – 35°, white area
1	180	60°	from 60 – 65°, white area

Water temperature gauge			
Temperature °C	Resistance Ω	Pointer angle	Display range
45	239	0°	from 0 – 10°, white area
60	134	0°	
75	82	14°	
90	51	20°	
105	33,4	42°	from 42 – 52°, red area
113	26,8	53°	
120	22,4	60°	

Switch, cooling water temperature (S32):

Switching temp.....105 °C
Type of contact..... Normally open

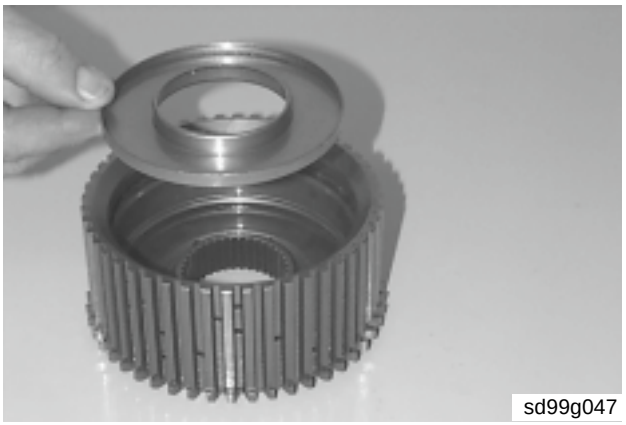
Compressed air indicator			
Pressure in bar	Resistance Ω	Pointer angle	Display range
0	10	0°	from 0 – 13°, red area
2	52	0°	
4	88	6°	
6	124	24°	from 37 – 42°, white area
8	155	42°	
10	184	60°	from 59 – 63°, white area

Tractormeter			
Engine speed ^{1}/min	Permissible deviation	Pointer angle	Frequency at generator terminal "W"
1000	± 100	67°	260 Hz
2000	± 65	163°	500 Hz

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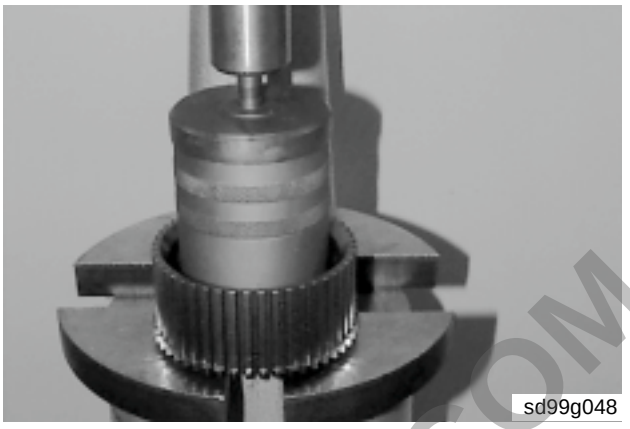
STEP 3



Insert the shielding plate (Item 4).

WARNING: *Ensure it is fitted correctly – see also Figure 2!*

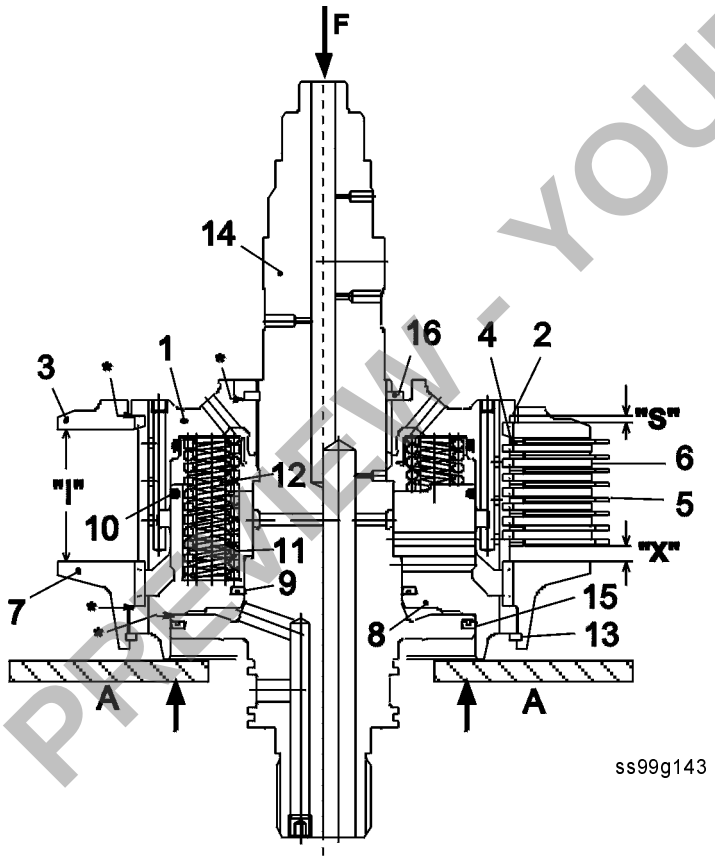
STEP 4



Press the shielding plate in, till it seats.

Adjusting the disk assembly air gap:

FIGURE 3



Legend to Figure 3

1 = Inner disk carrier
2 = Packing ring ("S" optional)
3 = End ring
4 = Spring disk
5 = Outer disk
6 = Inner disk
7 = Pressure plate
8 = Piston
9 = Lip sealing ring
10 = 'O'-Ring
11 = Pressure spring
12 = Pressure spring
13 = Circlip
14 = Clutch shaft
15 = Lip sealing ring
16 = Locking ring

* = Seating ⇒ no play
X = Air gap (play) ⇒ 6.0 – 0.4 mm when the disk assembly is compressed (outer disk corrugation is flattened)
F = Axial force 8000 ± 300 Nm
A = Support (support – front side/piston)

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Maintenance and Inspection Schedule

Operating hours	50	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000
GEARBOX, HYDRAULIC SYSTEM																	
Check gearbox oil level, if necessary top up (viewing glass)	X	X		X		X	X	X		X	X	X		X	X	X	
Gearbox oil change (at least 1 x per year)			X		X				X				X				X
Gearbox: replace both filter cartridges			X		X				X				X				X
REAR AXLE PLANETARY GEARING																	
Rear axle planetary gearing (left and right) Check the oil level		X		X		X	X	X		X	X	X		X	X	X	
Rear axle planetary gearing (left and right) Oil change	X		X		X				X				X				X
FRONT AXLE																	
Check oil level (centre section)			X				X				X				X		
Drive oil change (centre section)	X				X				X				X				X
Planetary gearing oil change (left and right)	X		X		X		X		X		X		X		X		X
Check wheel bearing play			X		X		X		X		X		X		X		X
POWER ASSISTED STEERING																	
Common Oil supply for transmission and hydraulic systems																	

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Operation

Main suspension switch ON/OFF - the following positions are available for selection:

Left-hand side of switch pressed - **Suspension OFF(suspension inhibited).**
- The suspension lowers the ***axle to*** the ***limit*** of the suspension cylinder.
- Recommended ***mode*** for driving in ***hilly terrain*** and ***contour lines***.
- ***Stipulated mode prior to opening the system*** (reservoir free of pressure).

Switch in the mid position **- Suspension ON (100% spring travel)**, indicator lamp lit.
The suspension goes to or remains in the middle of the total range of travel, ***independent of weight.***

Important: in this operating mode, it is possible to ***freely select*** any desired ***height adjustment*** (ground clearance) ***within*** the total ***spring travel range*** using the ***auxiliary switch***, at speeds between ***0 and 14 km/h***. If a ***manual adjustment*** is made, the ***indicator lamp*** will ***go out***. This ***switch position activates*** an ***automatic function*** in the ***electronics***, which if the driving speed of ***14 km/h is exceeded***, returns the suspension from any freely selected height to 100 % spring travel.

Switch pressed briefly to the right - **End calibration procedure ON**.
(***push-button function***) - ***Activating 100 % spring travel,*** under any operating conditions

Push-button function held pressed for 10 sec`s - **Switch calibration procedure ON**.

Auxiliary switch - Push-button functions only, pressed to the ***left - lower***, to the ***right - raise***.

Holding the button pressed - Active at 100 % spring travel, ***alteration*** of ***ground clearance*** in the ***respective*** direction.
- During the calibration procedure, *stipulating* the ***upper and lower limits*** of spring travel.

Push-button pressed briefly - ***Height control OFF***

Note: When the tractor is started, the function which was last in use will take effect. The driving speed must however exceed 14 km/h for the height control to activate. Suspension OFF, remains OFF, axle remains at it's limit:

Indicator lamp on the instrument panel -Lamp ***OFF*** means, ***suspension OFF*** and/or ***suspension without height control***.
- Lamp ***ON*** means, ***100 % spring travel*** and height control active.
- Lamp ***blinks regularly*** confirms ***calibration procedure***.
- Lamp ***blinks irregularly*** means, depending upon the blink pattern, a ***fault*** has occured.

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Main switch

Auxiliary switch

Indicator lamp



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Towing procedure

The following lever positions are an absolute must:

– Crawler gear lever to the "Normal" position
– 6-speed main gear lever to the "Neutral" position

Towing when the engine is running:

Gearbox system pressure 18 bar must be available, (gearbox oil pressure warning lamp on the instrument panel is OFF) working hydraulic pump must be in operation (otherwise there is no rear axle lubrication).

Engine speed:	1200 - 1300 rpm
Towing speed:	max. 30 km/h
Towing time:	max. 2 hours

Towing when the engine is at a standstill:

Towing speed:	max. 10 km/h
Towing time:	max. 2 hours

Non-observance can lead to damage being caused to the gearbox!!

The gearbox oil level is 55 mm below the main gearbox shaft.No splash lubrication takes place.

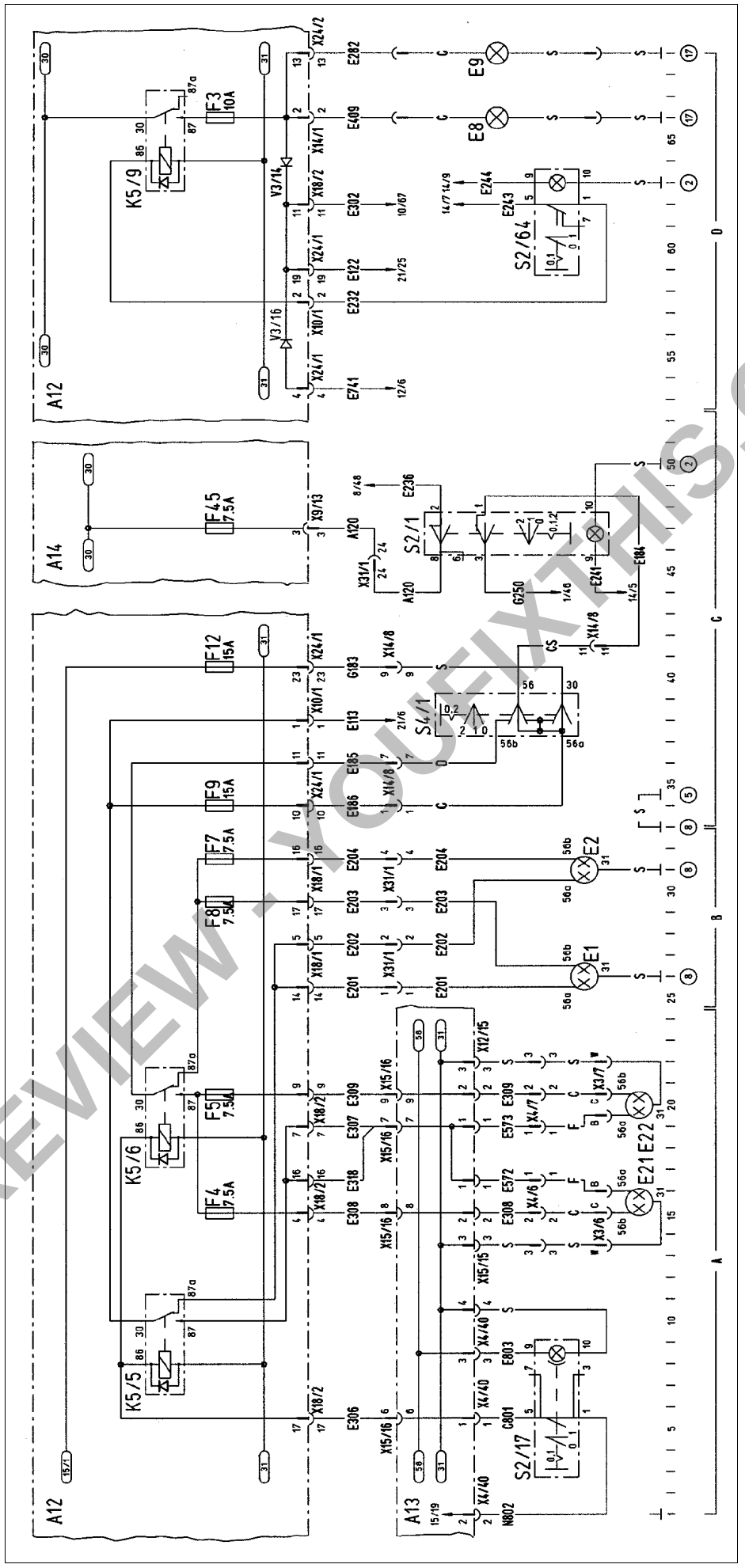
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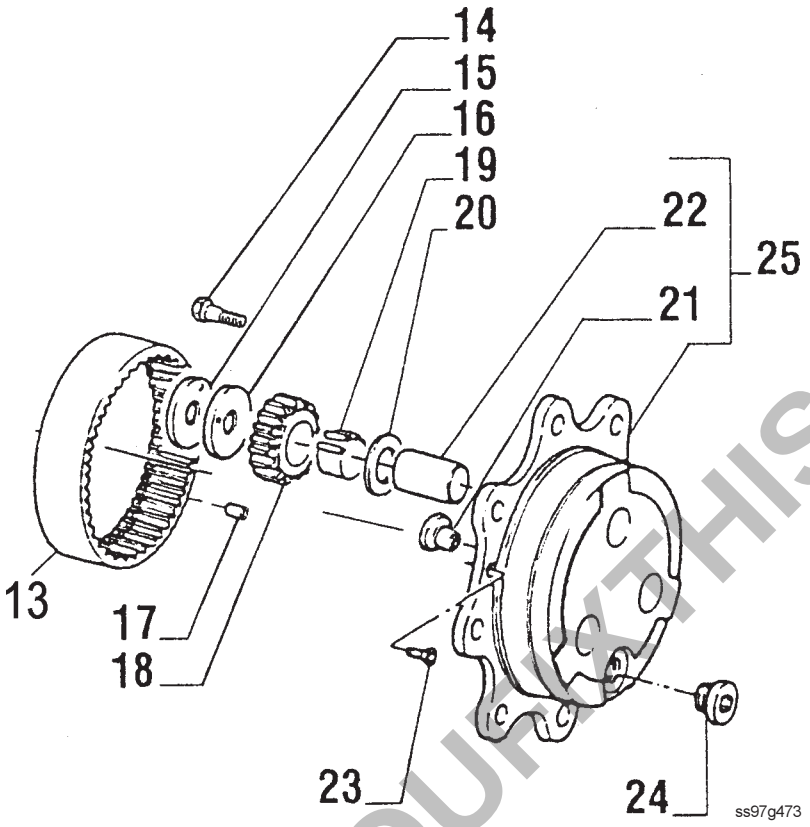
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PLANETENENDANTRIEB 20.25 ***EPICYCLIC REDUCTION GEARS 20.25***



- Öl ablassen.
- Beide Befestigungsschrauben (23) entfernen und Planetenträger von Radnabe abziehen.

- Nadellager (19) und Anlaufscheibe (20) auf Verschleiß prüfen und wenn nötig, austauschen.
- Die Bolzen (22) der Planetenräder sind in den Planetenträger eingepreßt und als Einzelstükke nicht austauschbar. Bei Beschädigung ganzen Träger tauschen.
- Montagehinweis: Teile der Nadellager mit Fett positionieren.
- Öl füllen, auf die richtige Spezifikation und Menge achten.
- Ölstand kontrollieren. Verschlußstopfen dazu waagrecht stellen.

- *Drain the hub oil*
- *Unscrew the two screws (23) and remove the planetary carrier assembly from the hub.*

- *Inspect the needle bearings (19) and the thrust washer (20) for wear and replace if necessary.*
- *The planetary gear shafts (22) are fitted to the carrier with interference. In case of wear or demage replace the carrier assembly.*

- *Hint for reassembling: if necessary hold the needle bearing in position with grease.*
- *Refill the hub with correct oil, see specification. The drain level plug bore position, must be at the top.*
- *Check the oil level with the plug at the horizontal line.*

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Hydraulic power-shift control

Pressure modulation – components

M	Modulation valve	
M1	Control slide	
M2	Cocking slider	
B	Bleed valve	
R	Reset valve	
T	Two stage-piston	hydraulically activated by P1 in the "field" mode
PR	Push rod	
R	Reversing valve	hydraulically activated by Y25 and with P2 in "road" mode
Y25	Solenoid valve	

Note: Control slider M1
Bleeder valve E
Return slider R
are in motion during each shift sequence, regardless of the mode

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Test options:

First of all it's necessary to check the pressures in the multi-disk clutches during the corresponding powershift step. The system pressure is controlled at the shift pressure valve and must have 18 bar. All test connections have a fine threat M10 x 1. The test option can be performed by means of a 25 bar manometer at pos. 5. This pressure must always be constant. If the pressure of 18 bar deviates, this can be corrected by means of adjusting washers in the shift pressure valve. The gear-valves shift the system pressure to each multi-disk clutch. This 16 bar pressure has to be measured at the measuring points 12/13 and 1/2. The pressure increases is very quickly and cannot be seen with a manometer. If the pressure of 18 bar cannot be reached, the only reason can be a leakage between gear valve - holding valve and multi-disk clutch. The solenoid valves Y21 to Y25 are electrically controlled and control the corresponding gear and holding valve using the applied pre-control pressure (10 bar measured at test point 3), in order to transport the 18 bar pressure to the multi-disk clutches. The task of the holding valve is to hold the previous multi-disk clutch when changing the powershift group until the new clutch reaches at least 8 to 9 bar. This moment is less than one second so that this value can only be taken by means of a recording manometer.
During a shifting procedure the new clutch has also to be filled with pressure corresponding to the characteristic field or road during that time when the old clutch is held - modulated pressure. Due to the short modulation period, this pressure distribution can also only be seen by means of a recording manometer. The pressure of safety shifting for the multi-disk clutch of the 4 steps can be measured at position 10. If this pressure increase does not match, the multi-disk clutches are switched to neutral. Similar situation at position 9 PR, where the safety pressure for F/B is monitored and leads to neutral in the case of a failure. At position 11, the applied pressure at the holding valve is measured.
The difference between the field or road shift is the time of the pressure modulation. In order to change this time so that shifting becomes harder of smoother you can change the C2-shield or mount another step piston. Whether the pressure modulation is correct or incorrect can only be determined by means of a recording manometer (i.g. multi 5000 - special tool).

The most important test points are:

1	and	2	-	Clutches D and C (18 bar)	] Should be measured together with 4 manometers if possible
12	and	13	-	Clutches B / G and A / F (18 bar)	
		7	-	the controlled pressure (has to follow the clutches	
		3	-	the pre-control pressure (10 bar)	

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SB 23 EHR-LS:

- proportional, single-action, LS sublevel construction
- permissible max. pressure p = 250 bar, R1 = 30 bar
- rated pressure flow is 80 l/min
- leakages A -> R = 4 cm^3/min at 125 bar, ν = 35 mm^2/s
- direct slider operation through 12 V proportional magnet
- coil: R = 1.7 Ω/max. = 3.5 A
- safety valve: 220 + 20 bar

Steering servostat:

- Manufacturer: Danfoss OSPQ LSR
- absorption volume of rotor pump is 80 cm^3/R
- oil flow with the amplifier slide opened to the maximum is 160 cm^3/R
- amplification starts at 10 rpm of the steering wheel
- PLV in the LS connection is 150 bar (from 1st June 1998, it will be 170-175 bar)

Tightening torque for block control units: see page 55.

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BASIC FUNCTION OF THE "EHR" DURING TRACTIVE FORCE CONTROL

Sequence of a control function:

1. Set mixed potentiometers to 100% tractive force (0).
2. The driver sets the desired values (setpoints) at the control panel.
3. The setpoints are immediately transmitted to the electronics box.
4. The momentary actual values are simultaneously recorded by the sensors and transmitted to the electronics box.
5. The electronics box continuously compares the setpoint values with the actual values.
6. If the actual values do not correspond exactly with the setpoint values, then the electronics box immediately activates one of the two magnets on the "EHR" control unit until the actual values correspond with the setpoints values. This is why the desired working depth can only be set under tractive force load (e.g. plowing). An exact setting of the position of the lifting arms is not possible during tractive force control!
7. As the "EHR" system used by STEYR carries out a continuous acknowledgment of the actual values, such a system is called a CLOSED - LOOP CONTROL CIRCUIT.

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