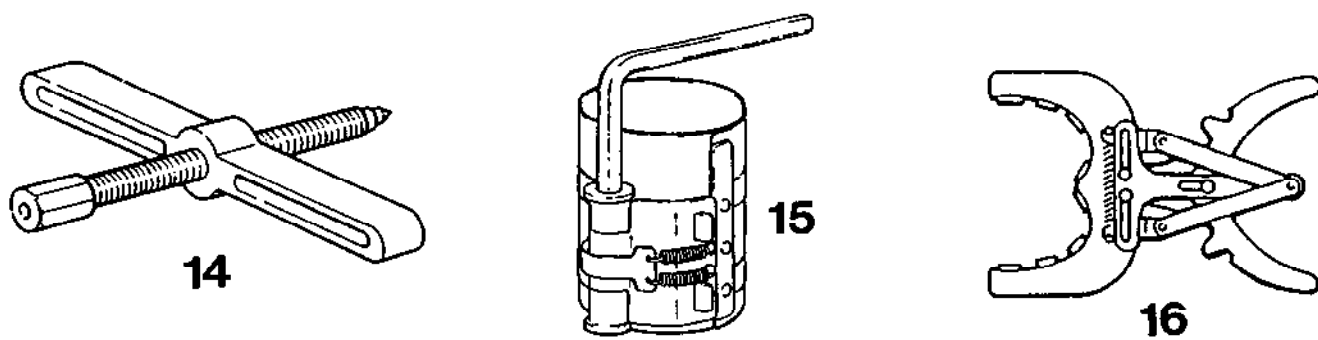
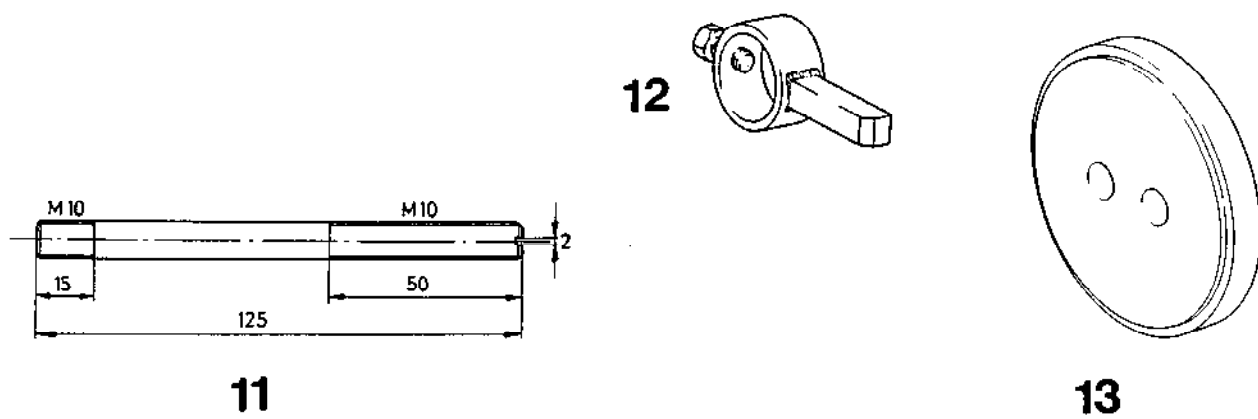
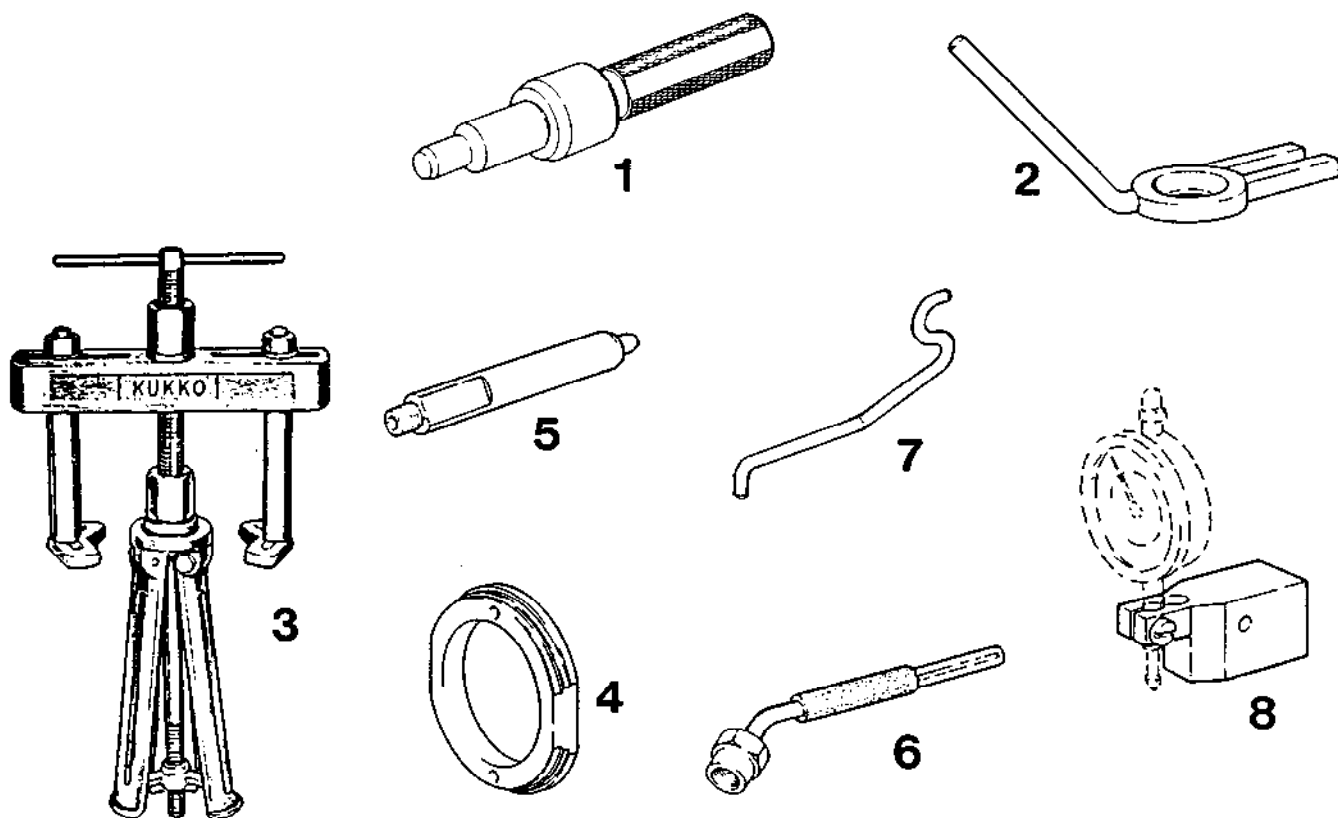


M9078, M9086, M9094 Tractors

Service - Training Manual Sva 7-96101

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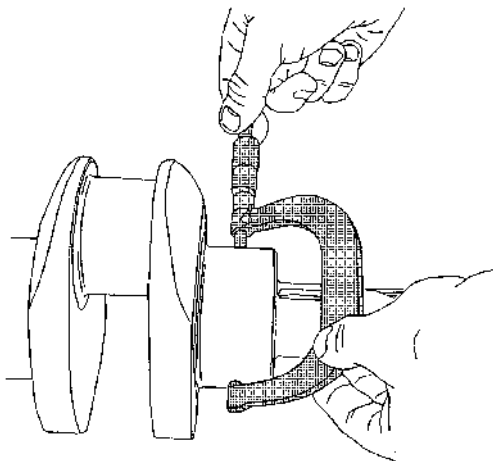


5. CRANKSHAFT

A. Removing the crankshaft

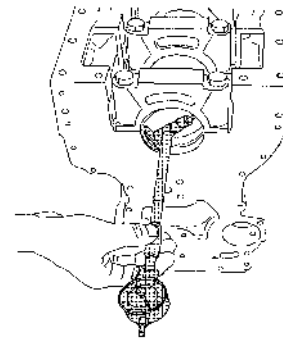
1. Unscrew the sump.
2. Separate the balancing unit lubrication oil line from the cylinder block and remove the balancing unit fixing bolts. Remove the balancing unit and the lubrication oil line (only for engine type 420).
3. Unscrew the securing bolts for the lubrication oil pump pressure line in the cylinder block. Remove the oil pump and the intake/pressure lines.
4. Remove the flywheel casing.
5. Remove the belt pulley/hub from the front end of the crankshaft (also refer to the instructions concerning the timing gears page 46).
6. Remove the con-rod bearing covers and push the con-rods up so they are not in the way when removing the crankshaft.
7. Remove the crankshaft bearing covers and lift the crankshaft out.

B. Checking the crankshaft



SS99N078

1. Clean the crankshaft. Do not forget to clean the oil bore holes.
2. Measure the wear on the crankshaft bearing journals at different points. Ovality, conicity or other wear must not exceed **0.03 mm**.
3. Insert the bearing caps with new bearing shells and tighten them to the correct torque. Measure the inner diameter with a dial test indicator, which has been reset to zero according to the dimensions measured under item 2. The indicator thus displays the actual bearing play. If the bearing housing which shows signs of wear is not round, take measurements at several points.

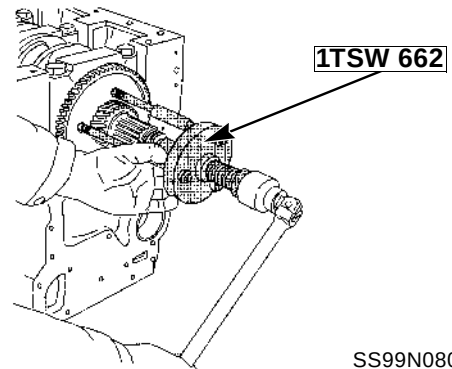


SS99N079

4. If the bearing play exceeds **0.18 mm** for the crankshaft bearings or **0.14 mm** for con-rod bearings with new bearing shells, the bearing journals on the crankshaft must be ground. For the correct undersize and corresponding bearings, refer to the technical data. Make sure the radii do not change during the grinding process.

NOTE: In the event of the crankshaft bearing base bore holes being damaged or worn as a result of bearing damage, crankshaft bearings are also available as a spare part with an oversize of 1.0 mm (outside dimension) and an undersize of 0.5 mm (inside dimension). The cylinder block must now be machined to a dimension of **92.000 - 92.025 mm**. The crankshaft must be machined to a dimension of **84.485 - 84.520 mm**. The bearing shell with a groove and a hole is fitted in the cylinder block and the bearing shell without an oil bore hole in the bearing cap.

C. Replacing the crankshaft gear wheels

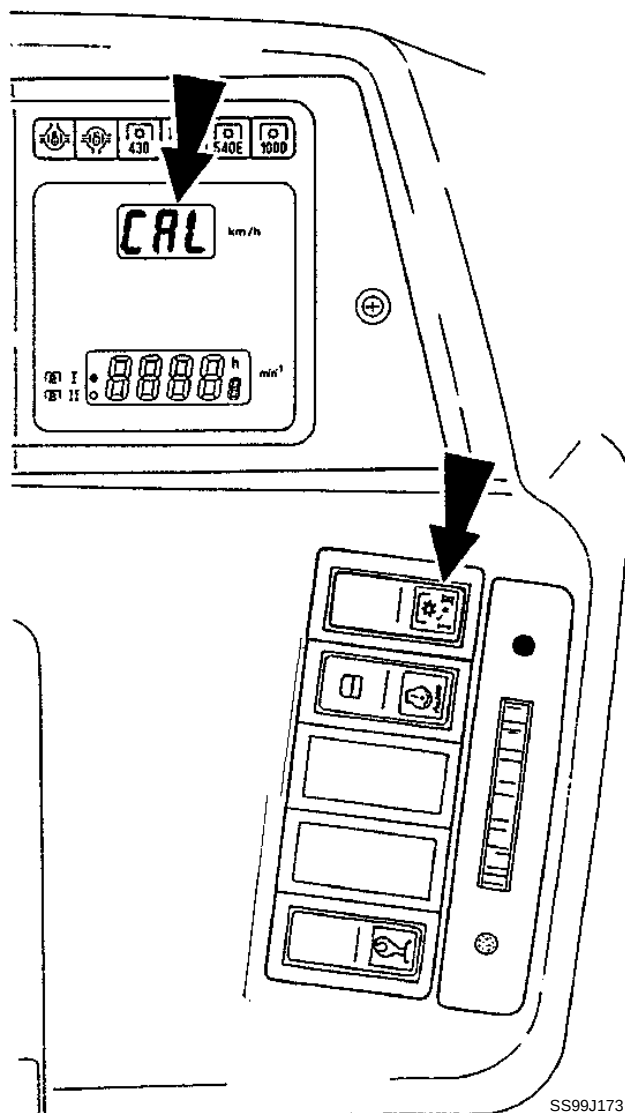


SS99N080

1. Attach an extractor to the crankshaft gear wheels and pull off both gear wheels.
2. Clean the seat on the crankshaft using a wire brush, for example.
3. Heat up the new gear wheels to **200 °C**. Drive the gear wheels onto the shaft using a suitable sleeve or soft mandrel. Pay attention to the position of the feather key and make sure the alignment marks on the front gear wheel are visible. Allow the parts to cool down.

CALIBRATING THE DRIVING SPEED

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



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

- Press the switchover button (front PTO shaft/rear PTO shaft/operating hours) for at least 10 seconds, until CAL appears in the km/h display.
- Drive vehicle forward and when the tractor's front axle passes the 0 mark, press the button briefly. The display shows COU.

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.

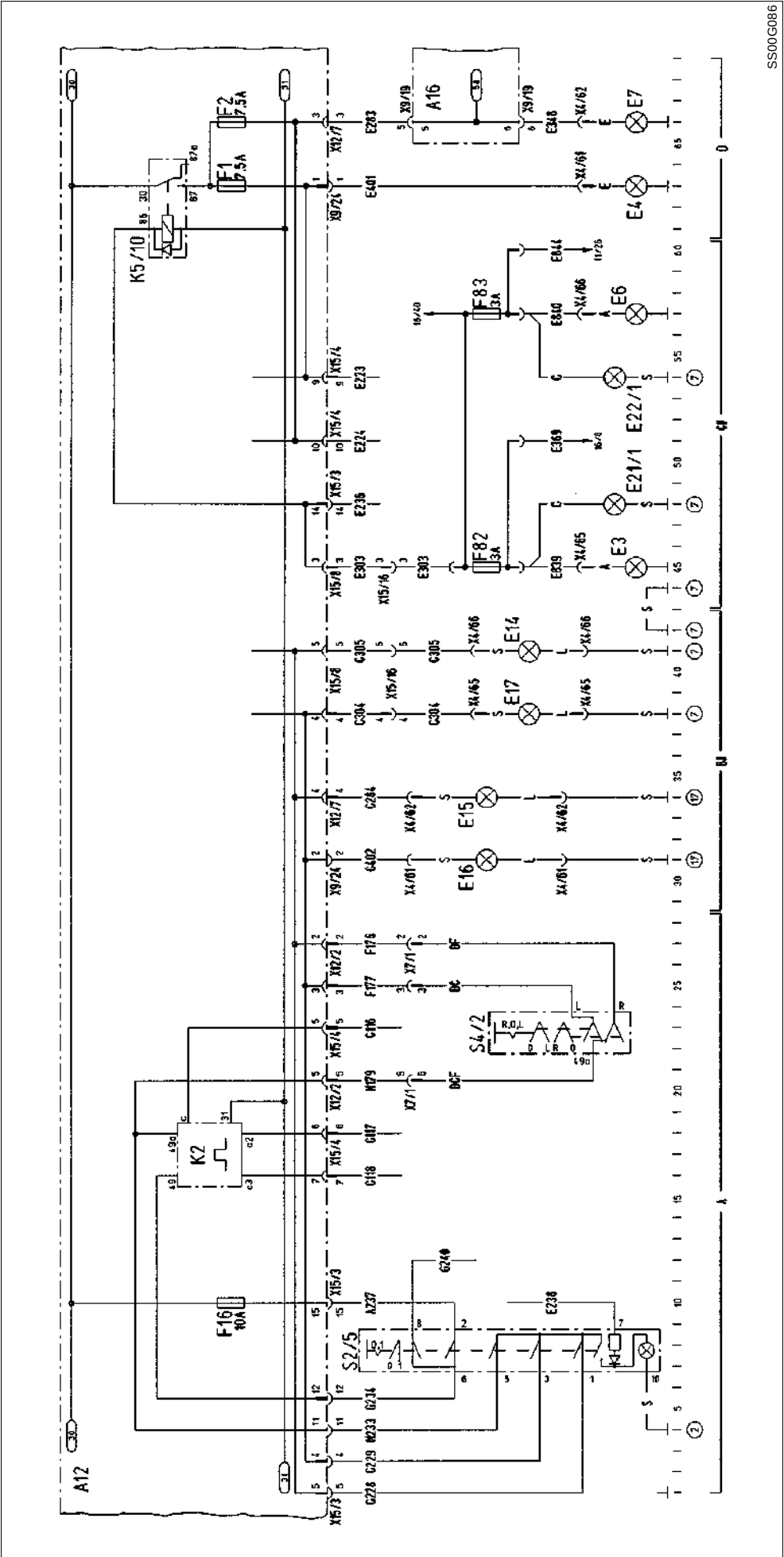
- When the front axle is in line with the 100 m mark, press the pushbutton briefly once again – the letters **PRO** appear on the display.
- Then press the switchover button once again – the re-calibration values are stored.

If the driving speed is not displayed, the tractor must be stopped and the engine must be stopped and then started again.

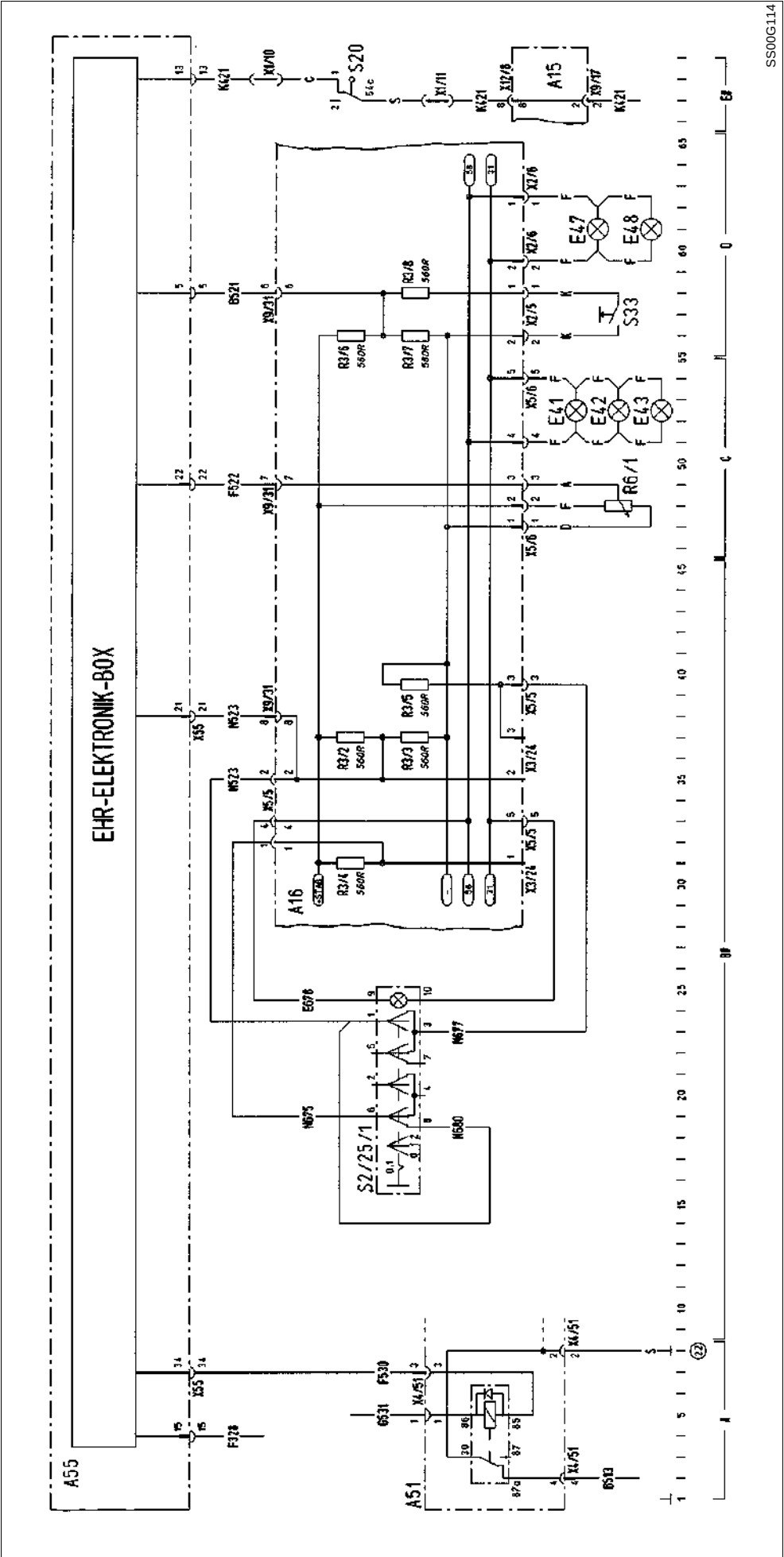
If a fault occurs during calibration (delay in pressing the switch etc.), simply switch the ignition OFF before pressing the switch for the last time – the programming sequence will thus not be accepted and the old values remain in effect.

Repeat the procedure.

SS99J173

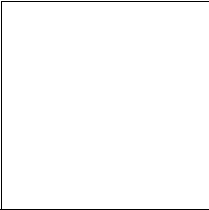


SS00G086



SS00G114

Electrical equipment	
A13	Print, roof electrics
E5/3	Lighting, number plate, roof
E5/4	Lighting, number plate, roof
E18/1	Heated mirror, left
E18/2	Heated mirror, right
E20	Spot
E25	Heated windscreen, front
E26	Heated screen, rear
E76	Fuse, heated screen, rear
E77	Fuse, heated windscreen, front
K5/35	Relay, heated mirror
K6/7	Relay, heated screen, rear
K6/8	Relay, heated windscreen, front
S2/16/1	Switch, heated screen, rear
S2/16/2	Switch, heated windscreen, front
S2/19	Switch, heated screen
X4/5	Plug-in connection, roof frame
X4/15	Plug-in connection, mirror heating
X4/19	Plug-in connection, heated windscreen, front
X4/20	Plug-in connection, heated screen, rear
X4/39	Plug-in connection, roof switch
X4/41	Plug-in connection, roof switch
X4/42	Plug-in connection, roof switch
X4/43	Plug-in connection, number plate lighting
X4/..	Plug-in connection, roof switch
X15/16	Plug-in connection, supply cable, roof

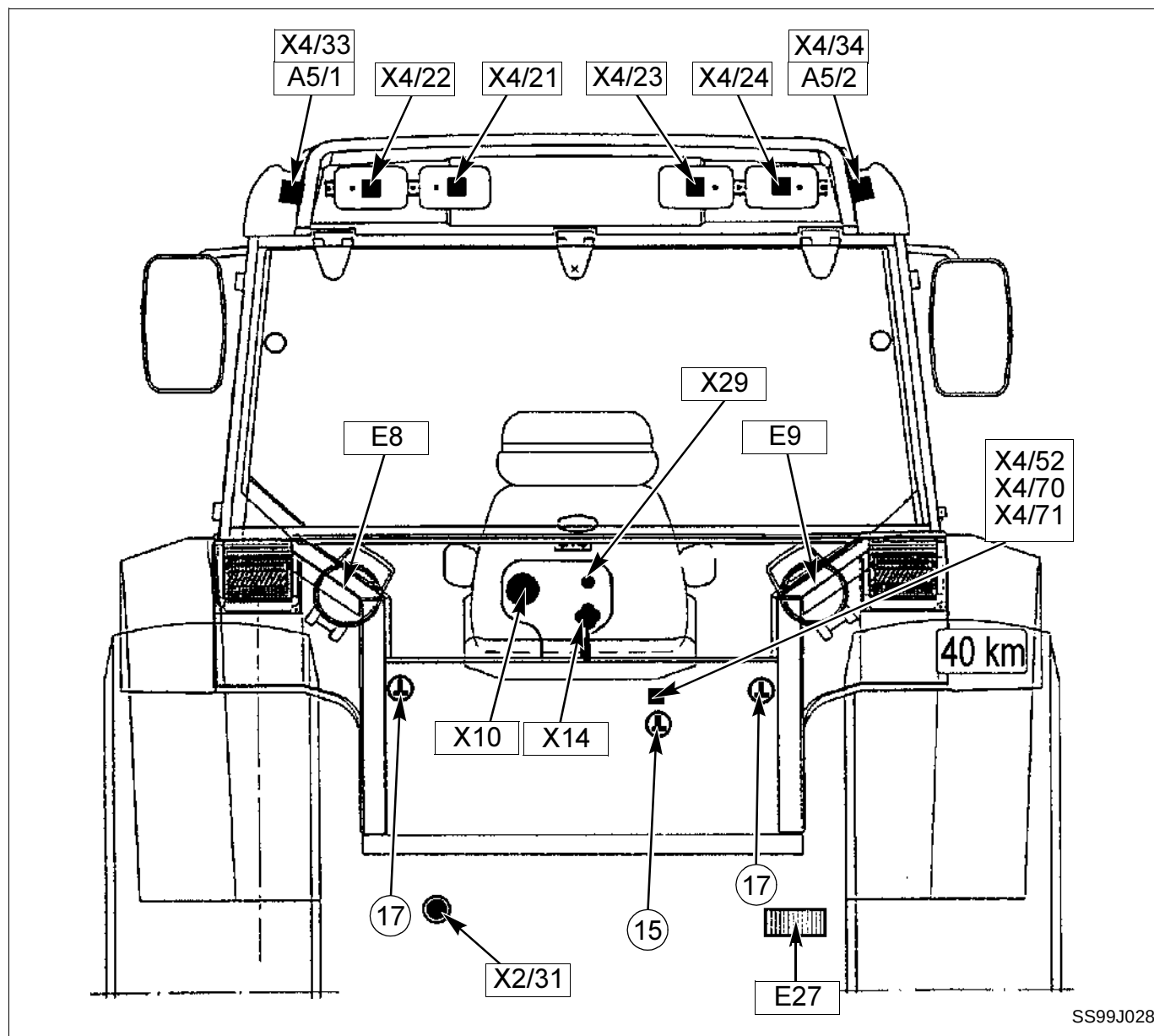


Grounding points

Designation of Sections	
A	Mirror heating, high-top
B	Spot, high-top
C	Roof number plate lighting, high-top
D	Heated windscreen, high-top
E	Heated rear screen, high-top

Cable colour or coding in accordance with standard 05449		
Ident. letter	Colour	Type of use
A	Red	+ 30 (potential 30) = Cont. current
B	Beige	-- Control line (ground)
C	White	+ Control line (positive)
D	Yellow	+ 15 Si (Potential 15 safety)
E	Grey	Potential 58 Lighting cable
F	Green	Signal cable
G	Violet	+ 15 (potential 15.1 or 15.2) switched current after the pre-glow switch
H	Orange	VDC, stabilised by the 'E' Box
K	Light blue	D+
L	Brown	Ground via a box
N	Pink	Spare
P	Colourless	Spare
S	Black	Ground, directly to a grounding point

List of Plugs (at rear)

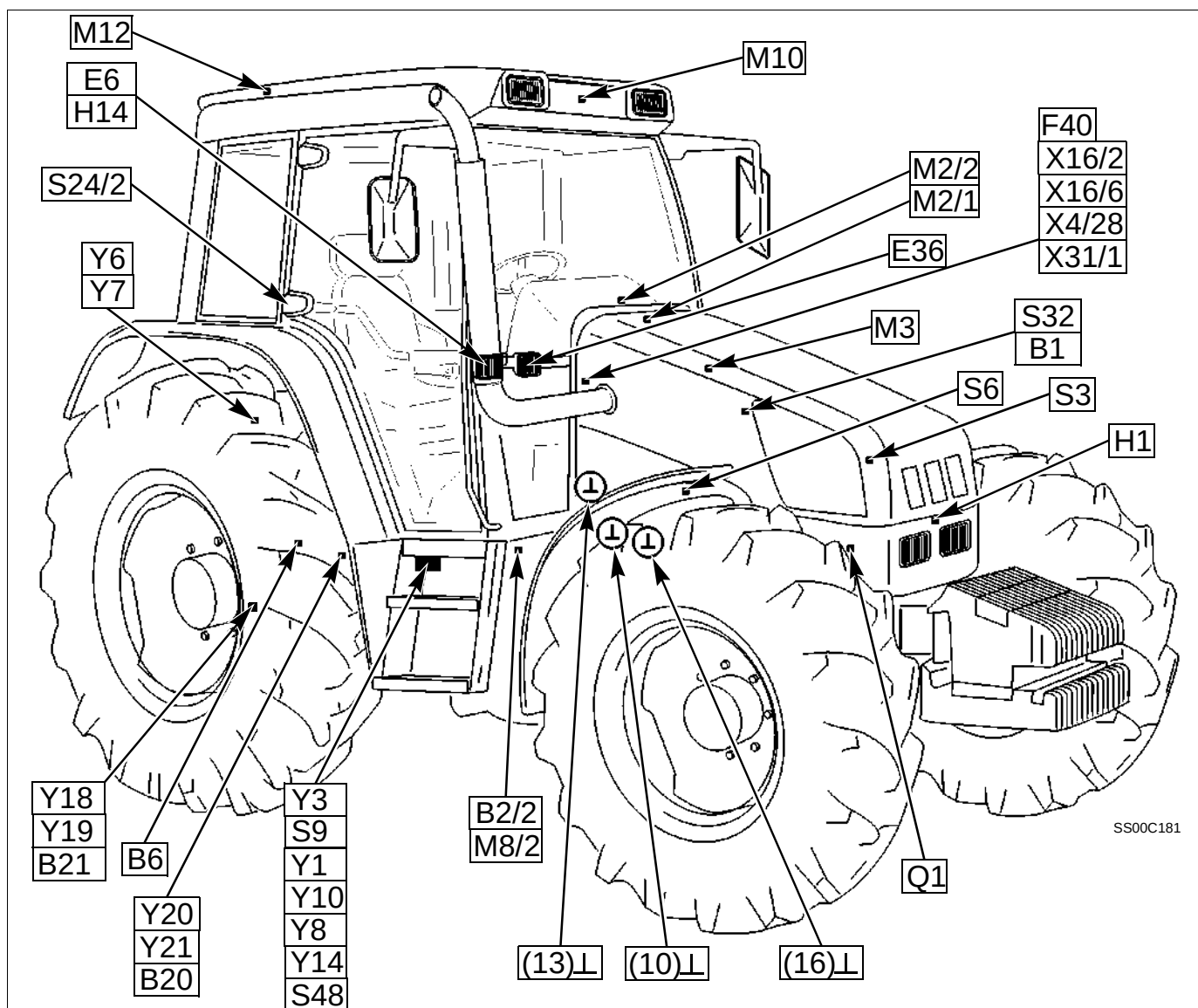


Electrical equipment		Grounding points		Designation of Sections	
A12	Central print	2	Instrument panel	A	Fuel filter heating
A60	ECCU (Electrical Central Control Unit)	4	Console	B	Power shift
D1/1	Diode group, fuel filter heating	5	Instrument plug	C	Power supply, ECCU
E27	Searchlight on the rear axle	22	Engine compartment	D	Searchlight on the rear axle
E32	Fuel filter heating		E box console	E	Reserves – central print
F15	Fuse, searchlight, rear axle				
F34	Fuse, reserve potential 15				
F35	Fuse, reserve potential 15				
F36	Fuse, reserve potential 30				
F37	Fuse, reserve potential 30				
F44	Fuse, fuel filter heating				
K5/28	Relay, fuel filter heating				
K5/37	Relay, searchlight, rear axle				
S2/68	Switch, rear axle searchlight				
S9	Power shift group safety switch				
S34/1	Switch, power shift, "LOW"				
S34/2	Switch, power shift, "HIGH"				
X1/28	Plug-in connection, flat, filter heating				
X2/11	Plug-in connection, searchlight, rear axle				
X3/1	Plug-in connection, power shift				
X4/13	Distributor, engine, potential D +				
X4/45	Central print, spare plug-in connection				
X5/1	Plug-in connection, central print, ground				
X6/1	Plug-in connection, spare				
X6/7	Plug-in connection, spare				
X6/11	Plug-in connection, chassis, right, power shift				
X10/2	Plug-in connection, cable, chassis, right				
X14/2	Plug-in connection, instrument cable				
X18/2	Plug-in connection, roof supply				
X24/3	Plug-in connection, chassis, right, ECCU				
X24/1	Plug-in connection, instrument cable				
X24/2	Plug-in connection, chassis, right				
X24/3	Plug-in connection, chassis, right, instrument cable				
X24/4	Plug-in connection, chassis, right, ECCU				
X31/1	Plug-in connection, instrument – engine				
Y3	Power shift group solenoid valve				

Cable colour or coding in accordance with standard 05449

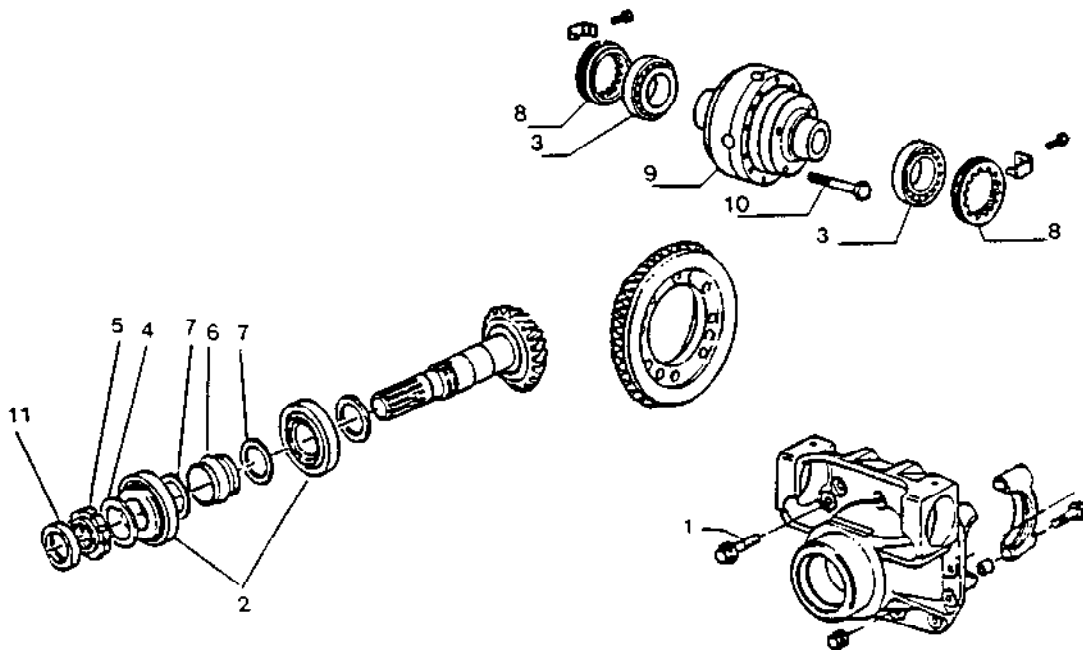
Ident. letter	Colour	Type of use
A	Red	+30 (potential 30) = Cont. current
B	Beige	-- Control line (ground)
C	White	+ Control line (positive)
D	Yellow	+ 15 Si (Potential 15 safety)
E	Grey	Potential 58 Lighting cable
F	Green	Signal cable
G	Violet	+ 15 (potential 15.1 or 15.2) Switched current after the starter switch
H	Orange	VDC, stabilised by the 'E' Box
K	Light blue	D+
L	Brown	Ground via a box
M		Grounding strip
N	Pink	Spare
P	Colourless	Spare
S	Black	Ground, directly to a grounding point

List of Plugs, Right



SS00C181

B1	Engine temperature transmitter	S32	Switch, water temperature indicator
B2/2	Fuel tank content transmitter, right	S48	Switch, reversing light
B6	Inductive transmitter, driving speed	X16/2	Screw-on connector, engine 30, fused
B20	Pressure sensor, EGE	X16/6	Screw-on connector, engine 30, not fused
B21	Pressure sensor, EFH	X4/28	Plug-in connection, external pushbutton, Front-end lifting gear
E6	Sidelight, front right	X31/1	Plug-in connection, instrument – engine
E36	Searchlight on the fixing bracket	Y1	4-wheel drive solenoid valve
F40	Main fuse 100A	Y3	Power shift group solenoid valve
H1	Horn	Y6	Solenoid valve, EHR RAISE
H14	Trafficator, front right	Y7	Solenoid valve, EHR, LOWER
M2/1	Parallel wiper motor, front	Y8	Front differential lock solenoid valve
M2/2	Standard wiper motor, front	Y10	Rear differential lock solenoid valve
M3	Heater blower motor, bottom	Y14	Solenoid valve, rear PTO shaft
M8/2	Right-hand tank pump motor	Y18	Solenoid valve, 14 bar reservoir (EFH)
M10	Roof blower motor	Y19	Solenoid valve, 40 bar reservoir (EFH)
M12	Air-conditioning blower motor	Y20	Solenoid valve EGE
Q1	Battery master switch	Y21	Solenoid connector, EGE reservoir
S3	Switch, air filter indicator	(10)	Ground, starter mounting
S6	Oil pressure switch	(13)	Ground, bulkhead
S9	Power shift safety switch	(16)	Ground, starter
S24/2	Switch, door contact		

**DIFFERENTIAL, EINSATZ UND TRIEBLING/
TELLERRAD****DIFFERENTIAL SUPPORT AND CROWN
WHEEL / PINION SET**

Zur Demontage des Achseinsatzes Antriebswellen und Schrauben (1) entfernen.
 Triebblingslager (2) und Differentiallager (3) kontrollieren bzw. erneuern.
 Die Nutmutter (5), die Distanzbüchse (6) und die Scheibe (7) sowie der Wellendichtring sind nach jeder Demontage zu erneuern.

*To remove the differential assembly, unscrew the bolts (1) for on bench overhauling.
 Inspect the pinion bearings (2) and the differential side bearings (3) for wear or damage.
 In case of bevel gears replacement, ring nut (5), collapsible spacer (6) and washers (7) must be replaced.*

Replace the oil seal to avoid oil leak.

Die Einstellung ist wie folgt vorzunehmen:

The setting operation to do for this group are as follows:

Tragbild einstellen
 Triebblingslager einstellen (Rollmoment)
 Zahnflankenspiel einstellen
 Differentiallager einstellen (Rollmoment)

*Setting the bevel distance (contactreflection)
 Setting the pre-load of pinion bearings
 Setting the pinion / crown wheel back-lash
 Setting the differential bearing preload*

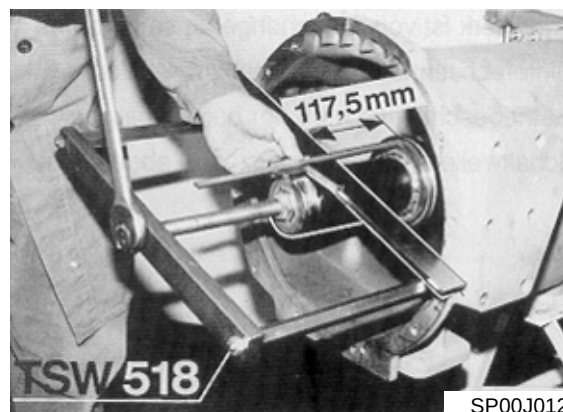
Spezialwerkzeuge:
 Schlüssel für Nutmutter (5) TSW 531
 Setzer für Dichtring (11) TSW 534
 Schlüssel für Ringmutter (8) TSW 532

*Special tools:
 Wrench for pinion ring nut (5) TSW 531
 Driver for oil seal (11) TSW 534
 Wrench for differential ring nut (8) TSW 532*

ACHTUNG: Tellerrad immer auf die richtige Seite einbauen.

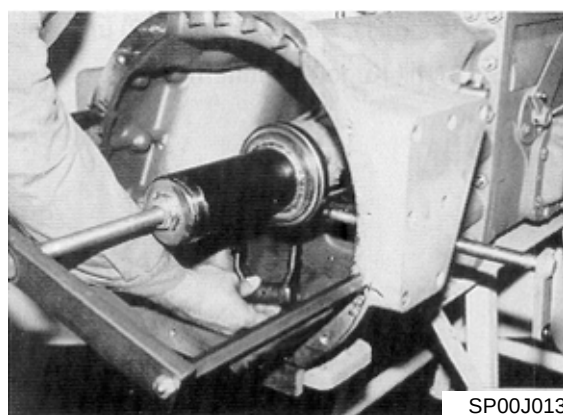
Please note that crown wheel can be fitted bot rh and lh of the pinion always ensure correct position.

Bring the power take-off shaft release bearing to a distance of 117.5 mm (gauge) with the TSW 518 clamping device.



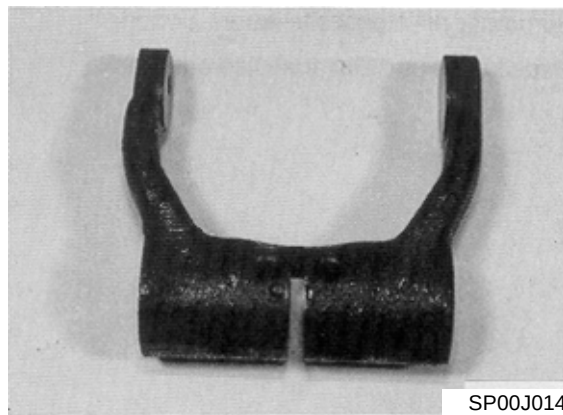
SP00J012

Fit release levers and forks. Force in clamping sleeves.



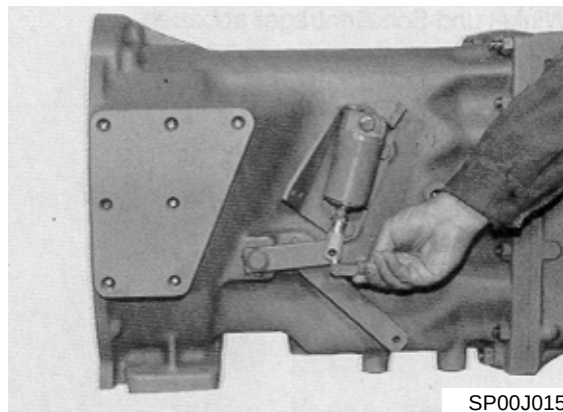
SP00J013

Divide the new release fork for the power take-off shaft clutch by breaking it.



SP00J014

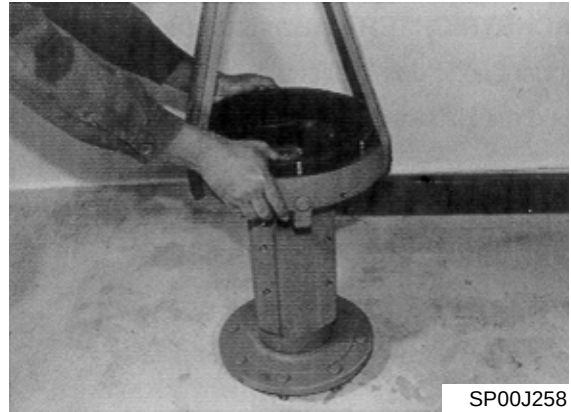
Mount pressure cylinder.
Remove clamping device and recheck adjusting value.



SP00J015

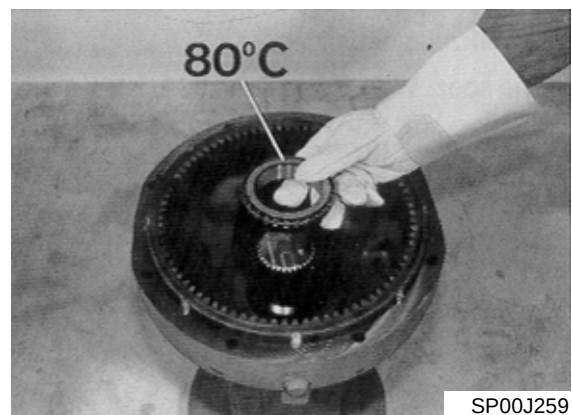
6.2

Lubricate the outer surfaces of the radial sealing ring and mount axle hub.



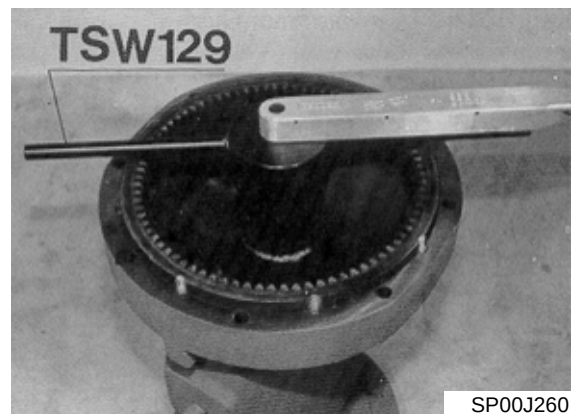
SP00J258

Mount tapered roller bearing warm.



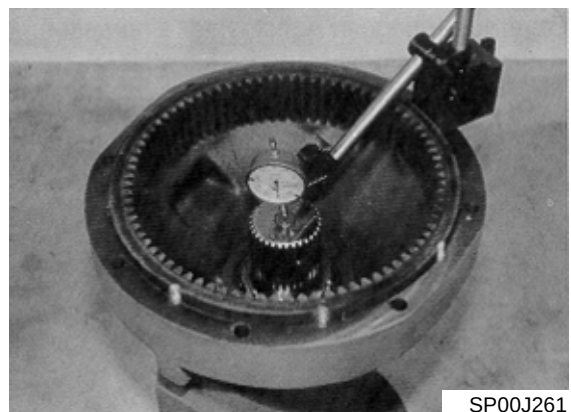
SP00J259

Tighten castellated nut with special tool (TSW 129) to 250 Nm. Turn by 90°. Knock axle shaft free.



SP00J260

Check the axial clearance of the rear axle shaft bearing. Adjust the axial clearance (0-0.015 mm) by turning the castellated nut.



SP00J261



Changes in operating the tractor:

When driving with an attached implement, e.g. driving on the field or on the road with lifted plough, the operator has to obey the following rules:

- a) The EHR must be enabled (diagnose LED off)
- b) The command RAISE must have been given

Now, automatically RIDE CONTROL will get active as soon as the ground speed is $> 8 \text{ km/h}$. This automatic function substitutes the purpose of the shock valve in the former control valve.

Changes of EHR functions (important for the field technician when trouble shooting):

- a) After a RAISE function was finished, load pressure also exists at the check valve. If by chance the lifting gear would move down gradually due to an internal leak in the system, also have checked whether the check valve in the control valve EHR 5-OC is leaking or not (see sections „valve construction“ and „functions“).

- b) During a DROP function, the EHR components *Drop modul*, *Position sensor* and *Electronic control box* act as a *closed sloop control circuit*. Thus, a two way flow divider is not required in the EHR 5-OC control valve. Instead, the E-box compares the voltage drop per second of the position sensor signal (drop rate) with the set value of the DROP SPEED potentiometer. If a correction is necessary, the E-box will alter the current to the DROP solenoid, resulting in an altered cross section at the partially open drop valve.

With the EHR 5-OC control valve, different load pressures are compensated electronically.

With the former EHR 4-OC control valve, a two way hydraulic flow divider was employed to compensate different load pressures.

- c) If the lifting gear would move down gradually (internal leakage in the system):
It is not necessary to check a shock valve, since it does not exist in the control valve EHR 5-OC.

NOTE:

Since the solenoids of both the versions of control valves are the same, electrical values for trouble shooting also remain valid (see page with technical data).

<i>Designation</i>	<i>X25 pin</i>	<i>Cable colour and No.</i>	<i>Measurement</i>	<i>Requirements</i>	<i>Measure from pin to pin</i>	<i>Value</i>
Supply to rear position sensor B9/1, power sensors B10/1 and B10/2						
Supply, E box	15	L489	U	 	15 —  15	approx. 0 VDC
Plus supply, 9.5 stabilised	13	H482	U	 	13 —  15	9.5 VDC
Signal from position sensor	19	F483	U	 	19 —  15	approx. 7 VDC approx. 2.3 VDC
Power sensors, left, B10/1, right, B10/2						
Signal from power sensor, left	17	F492	U	 	17 —  1	approx. 4.7 VDC <4.7 VDC >4.7 VDC
Signal from power sensor, right	18	F495	U	 	18 —  1	approx. 4.7 VDC <4.7 VDC >4.7 VDC
R6/1 Setpoint potentiometer						
Signal from potentiometer	16	F522	U	 	16 —  1	9.5 VDC 1.6 VDC
Lift limiting potentiometer (upper limit) R6/2						
Signal from potentiometer	22	F517	U	 	22 —  1	1.6 VDC 9.0 VDC
Lowering speed potentiometer R6/4						
Signal from potentiometer	24	F527	U	 	24 —  1	1.6 VDC 9.5 VDC
Mixing potentiometer R6/3						
Signal from potentiometer	4	F516	U	 	4 —  1	1.6 VDC 9.5 VDC