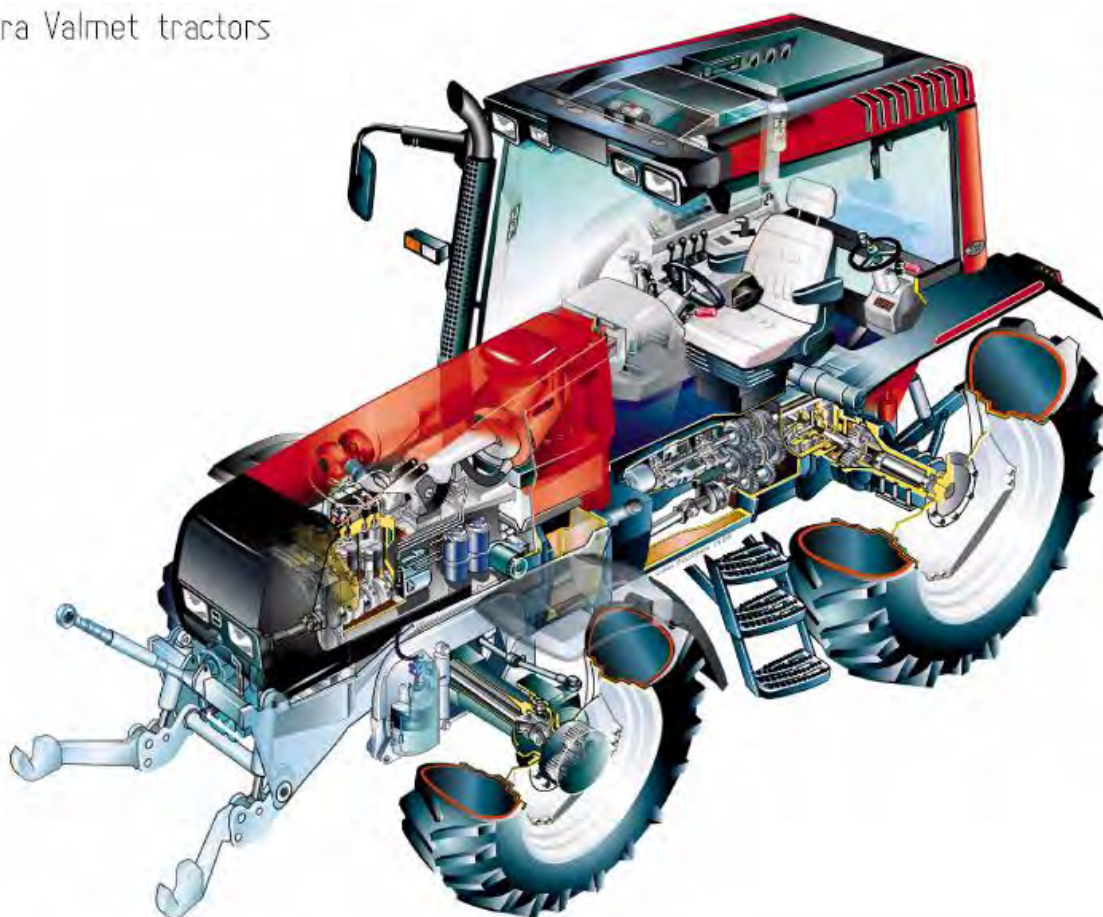


# VALTRA – VALMET MEGA MEZZO HI-TEC

Valtra Valmet tractors



## WORKSHOP MANUAL

# VALTRA

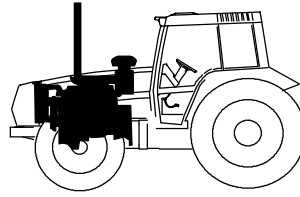
## Service Manual Tractors

Groups 10–100

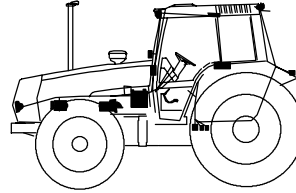
Valtra Inc.  
44200 Suolahti, Finland

Virtakäyttöön Käyttöohje  
Stromläsraße Arb. liss fram  
relä  
K3 20122001 K4

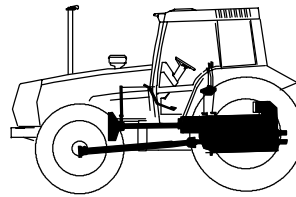
**10** General



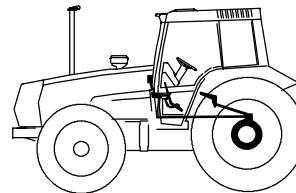
**20** Engine



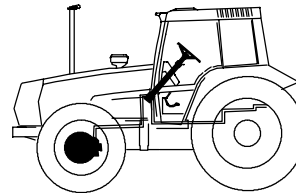
**30** Electrical system



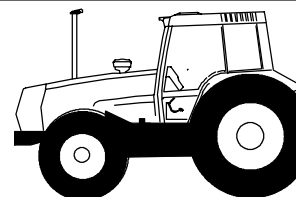
**40** Power transmission



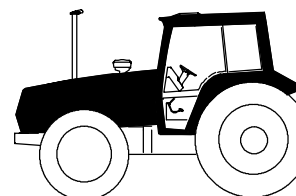
**50** Brake system



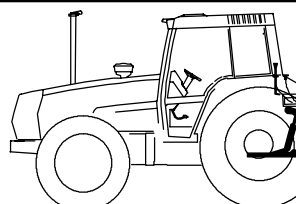
**60** Steering system and Front axle



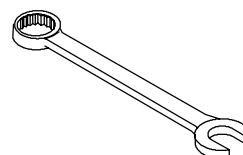
**70** Frame and Wheels



**80** Cab and Shields



**90** Hydraulics



**100** Tools

<b>67. Powered front axle Carraro</b>		Model	Code	Page
	1. 10. 1999	8450–8950	670	1

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A. Adjusting toe-in ..... 1  
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## Technical Data

Axle type	Carraro 20. 29
Electro–hydraulic differential lock (HiLock)	standard
Ratio, differential	2,538
Ratio, hub reduction gears	6,923
Total ratio	17,570
Ratio, front axle–rear axle	1,315
Steering angle, adjustable	max. 55°
Oscillation angle	±7°
Caster	6°
KPI	7°
Camber	1,5°
Toe –in	0–5 mm
Flange distance	1900
Oils:	
– in differential	6 litres
– in hubs	2x1,5 litres
– oil quality (e.g. Valtra Axle)	80W/90 GL–5 (LS)

## Setting values

### Bevel pinion shaft:

- bearing pre–load (measured with a spring balance on the shaft, Ø 34,8 mm) . . . . . 3–5 kg
- thickness of shims for position adjustment (with increment of 0,1 mm) . . . . . 2,50–3,40 mm

### Differential:

- bearing pre–load (measured with spring balance on the bevel pinion shaft, Ø 34,8 mm)
- is bevel pinion shaft bearing preload+ . . . . . 6–9 kg
- tooth backlash, bevel pinion–crown wheel . . . . . 0,17–0,23 mm
- thickness of thrust washers for differential side gears (with increment of 0,1 mm) . . . . . 1,45–1,55 mm
- tooth backlash, differential pinions–differential side gears . . . . . 0,13–0,18 mm
- thickness of steel discs in differential lock (8 pcs) . . . . . 1,43–1,57 mm
- thickness of friction discs in differential lock (7 pcs) . . . . . 2,24–2,36 mm

### Others:

- End float of central pivot bearing brackets . . . . . 0,1–1,1 mm

## Tightening torques

### Hubs:

- Hub cover (planet gear carrier) bolts (2 pcs) . . . . . 25 Nm
- Planet gear fixing bolts . . . . . 80 Nm
- Ring gear support fixing bolts . . . . . 230 Nm
- King pin covers . . . . . 190 Nm
- Front wheel bolts . . . . . 550 Nm
- Front wheel stud bolts to hub flange (threads) . . . . . 70 Nm
- Tie–rod tapered joint to knuckle housing . . . . . 220 Nm

### Bevel pinion shaft:

- Shaft nut is tightened until the bearing pre–load is correct.
- Bolts between bevel pinion shaft drive flange–propeller shaft drive flange . . . . . 70 Nm
- drive flange attaching bolts on bevel pinion shaft (2 pcs) . . . . . 60 Nm

### Differential:

- Differential bracket bolts to axle housing . . . . . 170 Nm
- Bearing covers of differential bearings . . . . . 265 Nm
- Crown wheel fixing bolts . . . . . 70 Nm
- Locking nuts for differential bearing adjusting nuts . . . . . 13 Nm

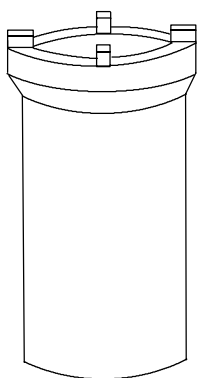
### Others:

- Front axle central pivot bearing bracket to tractor frame . . . . . 380 Nm
- Tie–rod ball joint . . . . . 300 Nm
- Tie–rod ball joint locking nut . . . . . 250 Nm
- Locking nut for steering angle limiting bolts . . . . . 150 Nm
- Bolts of steering cylinder end flange . . . . . 120 Nm
- Locking bolts for central pivot bearing brackets . . . . . 200 Nm
- Steering cylinder hoses . . . . . 45 Nm

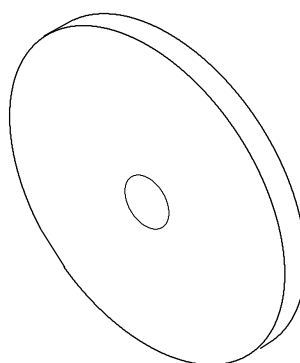
## Special tools

Ordering no.	Description
ETV 893 490	Socket spanner for bevel pinion shaft nut (also Carraro 505–905)
ETV 894 460	Plate to fit hub cassette seal (new)
ETV 893 450	Tool to adjust bevel pinion shaft position, which incl.:
	ETV 893 451, Measuring rod (1 pcs) (also Carraro 505–905)
	ETV 893 452, Screw M10x100 (1 pcs) (also Carraro 505–905)
	ETV 893 453, Compression plate (2 pcs) (also Carraro 505–905)
	ETV 893 454, Nut M10 (1 pcs) (also Carraro 505–905)

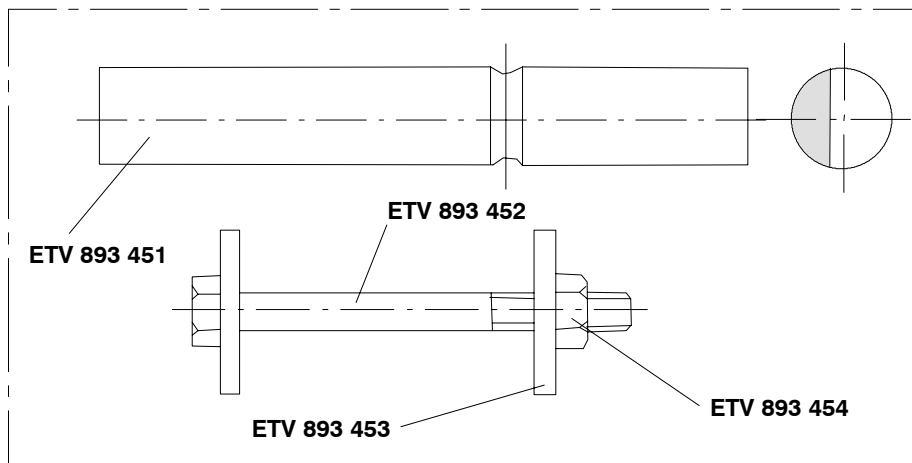
**Note!** Various bearings and bearing races can be removed by using a drift and a suitable puller. Fitting can be done with sleeves or plates of suitable dimensions. Bearings can be warmed or cooled according to the fitting. Drive shaft seals can be fitted with plates or sleeves of correct dimensions. Some earlier ValtraValmet ETV–sleeves and – plates can be used when repairing this axle.



ETV 893 490



ETV 894 460



ETV 893 450

## Description

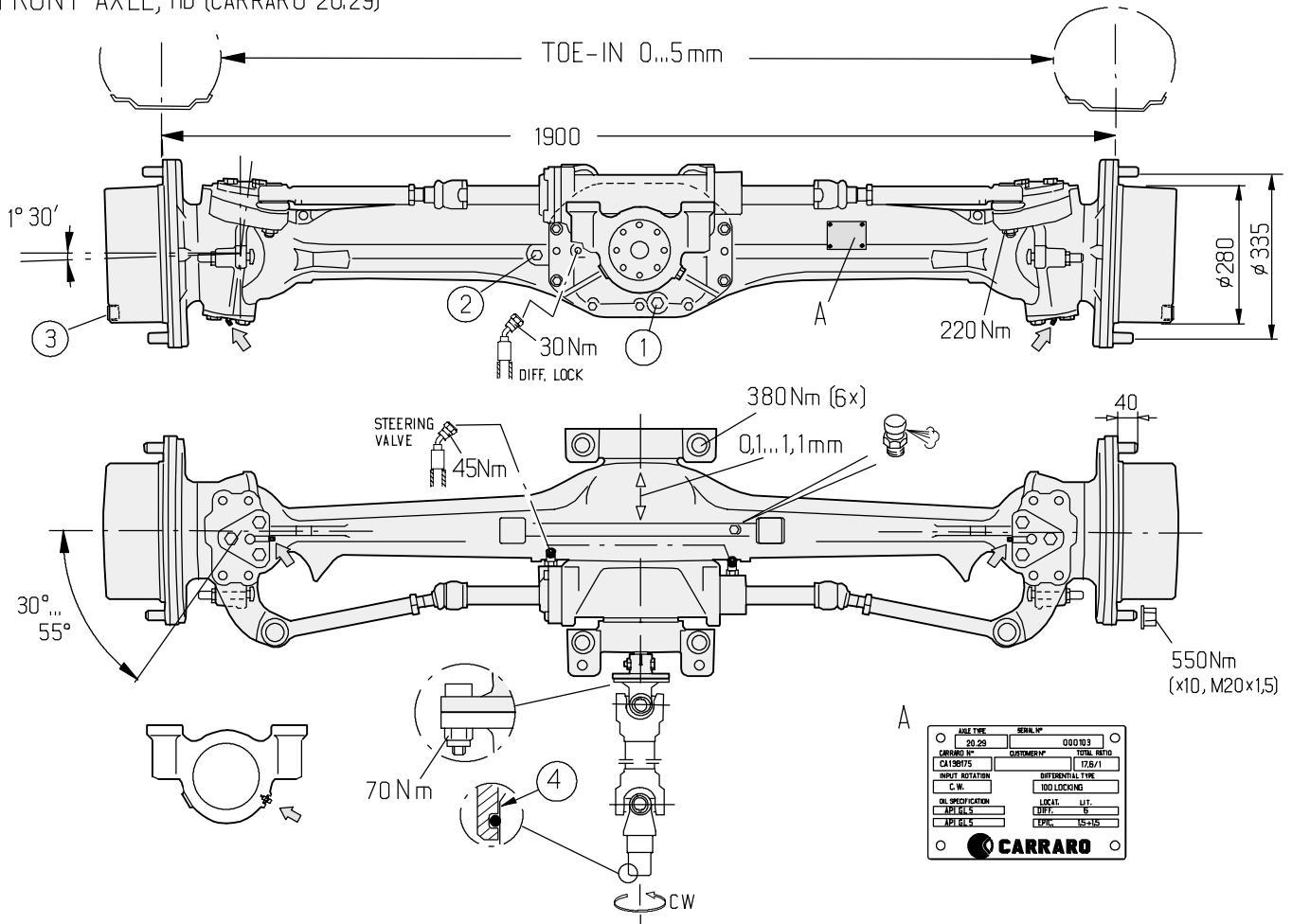
Carraro 20.29 axle replaces the earlier used Sige industrial front axle from week 32/99. The Carraro axle has as standard an electro-hydraulically controlled differential lock (HiLock), which functions simultaneously with the rear axle lock.

Earlier used front wheel discs cannot be used with this Carraro-axle, since the front wheel fixing studs are different.

Build-up of Carraro axle is shown in pictures on the following pages.

The maintenance intervals and oil qualities are the same as in Sige-axle. However, the grease nipples of the king pins are greased at intervals of 50 running hours/ weekly.

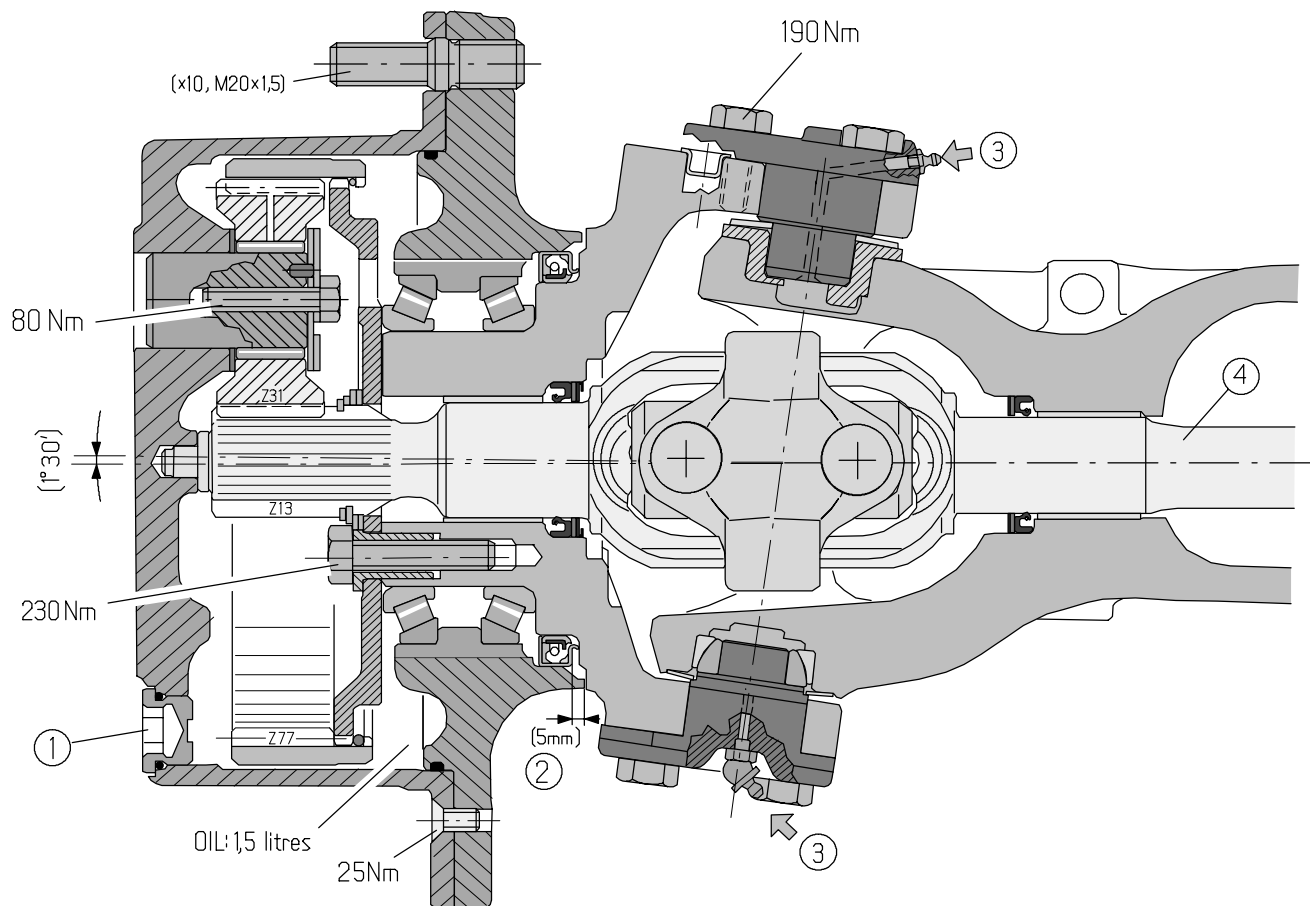
FRONT AXLE, HD (CARRARO 20.29)



Picture 1. Carraro front axle

- 1. Axle housing oil draining plug
- 2. Filling plug
- 3. Hub oil draining / filling plug
- 4. EP-grease on splines

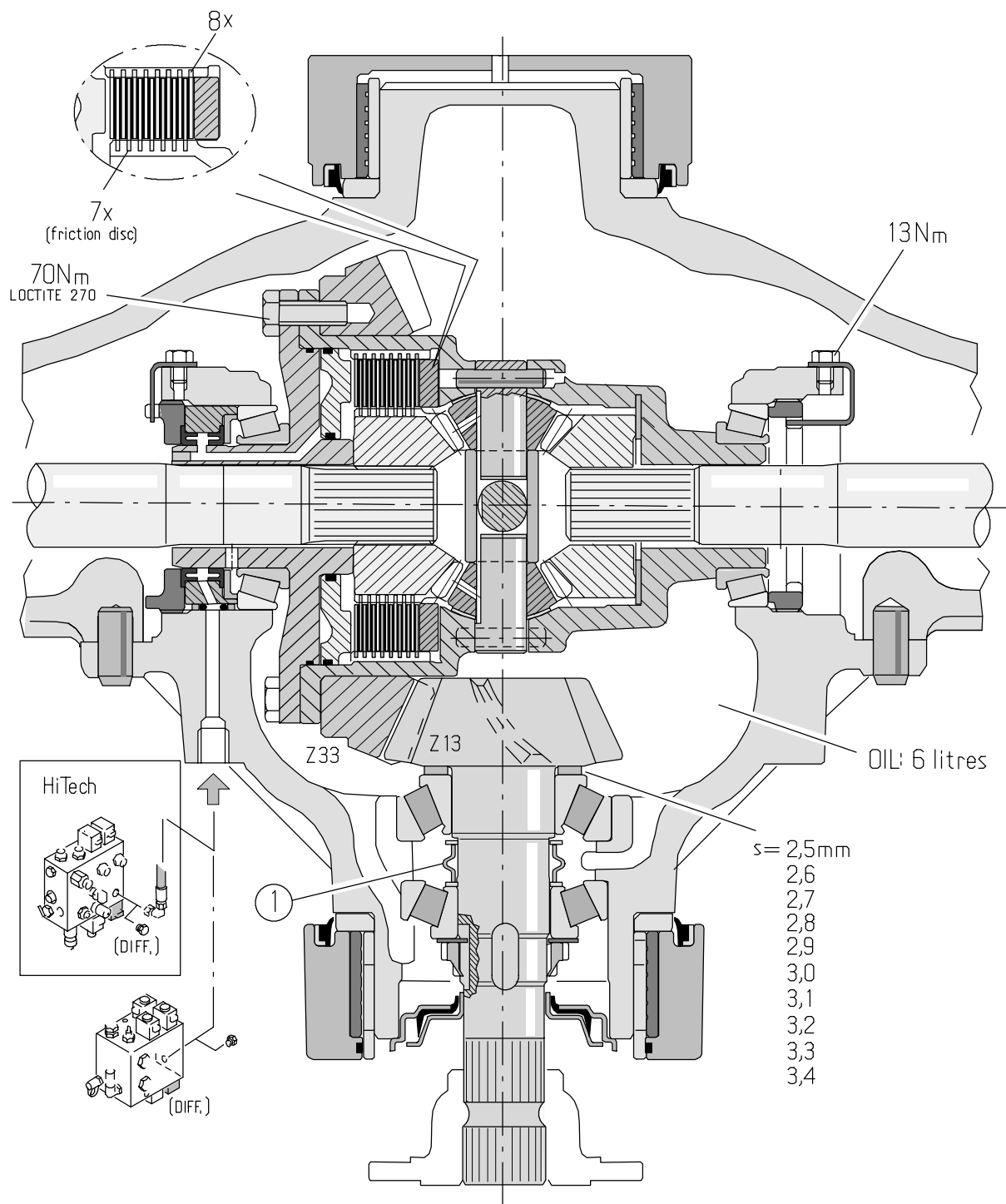
PLANETARY GEAR, HD (CARRARO 20.29)



Picture 2. Carraro front axle hub

- 1. Oil draining / filling plug
- 2. Mounting depth of hub cassette seal
- 3. King pin grease nipples (at intervals of 50 running hours / weekly)
- 4. Drive shaft

DIFFERENTIAL, HD (CARRARO 20.29)

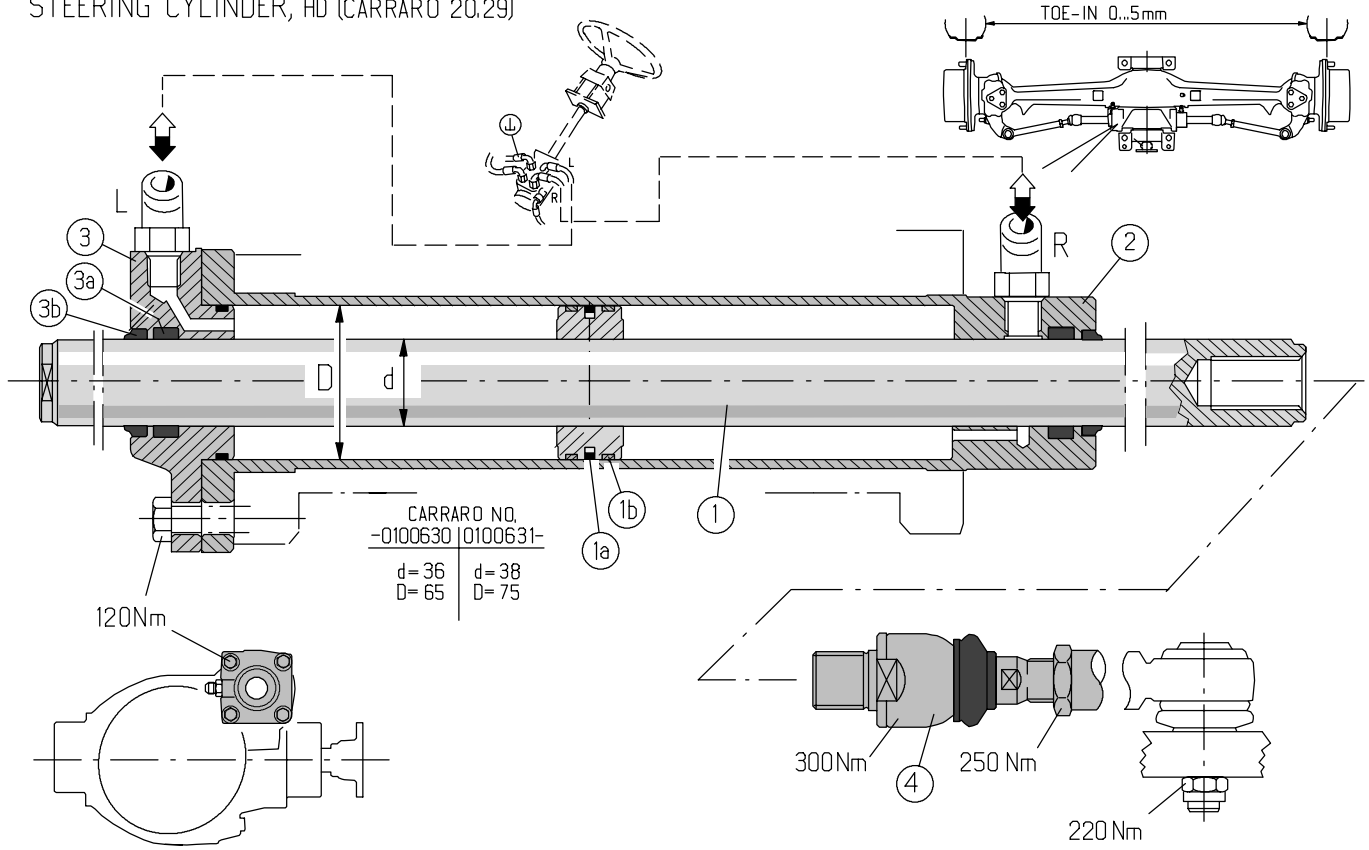


Picture 3. Differential, Carraro front axle

1. Compression bushing



STEERING CYLINDER, HD (CARRARO 20.29)



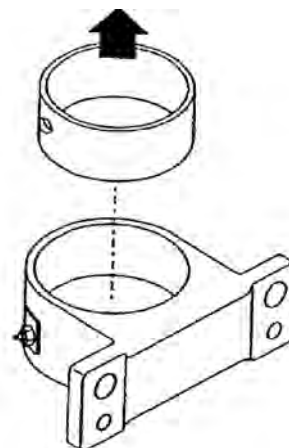
**Bild 4.** Steering cylinder

- 1. Piston rod and piston
- 1a. Piston seal + piston seal expander
- 1b. Wear rings
- 2. Cylinder liner
- 3. End flange
- 3a. Scraper
- 3b. Oil seal

## Axle housing and attaching brackets (Op. no. 671)

### A. Removing front axle

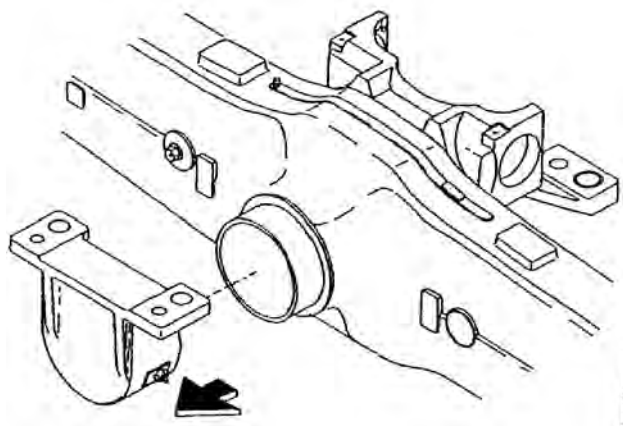
1. Apply parking brake. Scotch the rear wheels. Disconnect, if necessary, battery cables.
2. Drain oil in hubs and axle housing (if necessary for repair).
3. Remove the propeller shaft guard under the tractor. Disconnect the propeller shaft front end flange joint.
4. Disconnect oil hoses on the steering cylinder. Disconnect the differential lock pressure oil pipe on the axle housing. Raise the tractor front end and put axle stands under the front frame. Remove front wheels when needed.
5. Fasten lifting ropes to the axle on both sides of the engine.
6. Unbolt the central pivot bearing bracket bolts. Lower the axle and remove it.



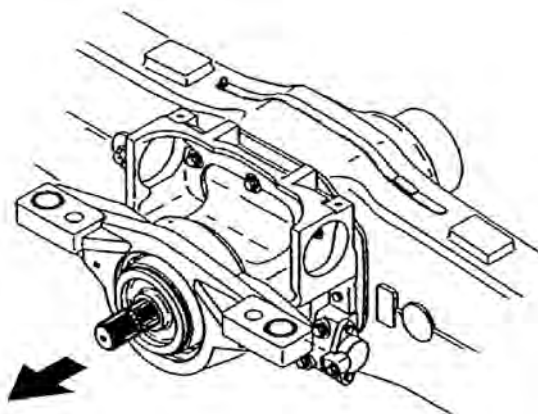
5. Slacken the locking bolt and remove the bearing sleeve. Check sleeve for wear. Change if necessary. Tighten the locking bolt.
6. Check the V-shaped seal ring on the axle. Change if necessary.

### B. Changing central pivot bearing sleeves.

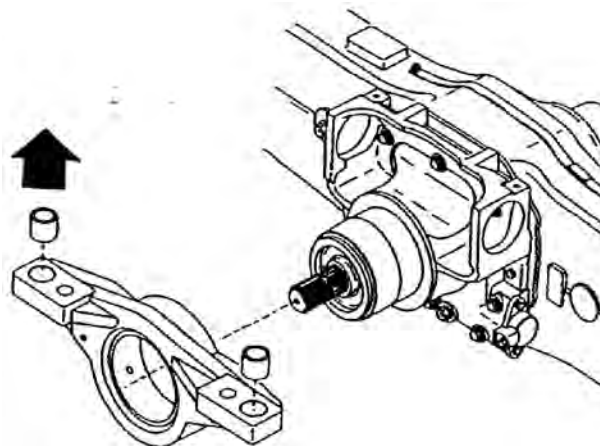
1. Apply parking brake. Scotch the rear wheels. Disconnect the battery cables.
2. Raise the tractor front end and put axle stands under the tractor.
3. Support the axle so that the bearing brackets can be unbolted.



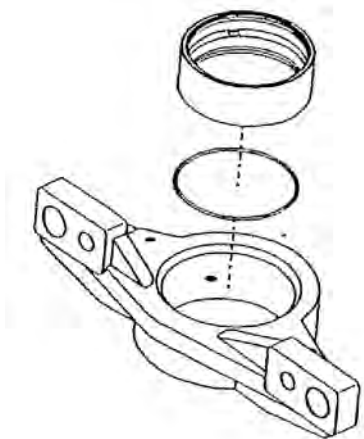
4. Open the bearing bracket bolts. Lower the axle until the guide sleeves release and remove first the foremost bearing bracket.



7. Remove the rearmost bearing bracket on the axle.



8. Check the condition of the sleeves. Change when necessary. Check also condition of the V-shaped seal on the axle, change when necessary.



9. Slacken the bearing sleeve locking bolt and remove the sleeve. Change if needed. Check also condition of the o-ring.

10. Fit the bearing brackets on the axle. Ensure, that the guide sleeves are in their places. Position the axle under the tractor and tighten the bearing bracket bolts to **380 Nm**.

11. Grease the bearings sleeves with universal grease (nipples).

12. Remove the axle stands under the tractor.

13. Test–run the tractor and check that axle functions are OK.

### C. Fitting front axle

1. Ensure that the bearing brackets are correctly positioned on the axle and that their guide sleeves are in place.

2. Lift the axle into place and tighten the bearing brackets to a torque of **380 Nm**.

3. Connect the oil hoses to the steering cylinder. Connect the differential lock pressure oil pipe. Connect the propeller shaft front flange joint (**70 Nm**).

4. Fasten the front wheels, if removed (**550 Nm**). Remove the axle stands under the tractor.

5. Fill the differential housing with oil (**6 litres**) and fill hubs (**2x1,5 litres**), if drained (oil quality 80W/90 GL–5 (LS), e.g. Valtra Axle).

6. Grease the bearing bracket nipples with universal grease.

7. Test–run the tractor and check that steering and front axle function properly. Check for leaks.

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